WINTER COMES AND GOES

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THE SCIENTIFIC LIVING SERIES

WINTER COMES AND GOES

THE HOW AND WHY SCIENCE BOOKS

by

GEORGE WILLARD FRASIER
HELEN DOLMAN
KATHRYNE VAN NOY

ILLUSTRATIONS
GUY BROWN WISER

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SYRACUSE CHICAGO DALLAS
PRINTED IN THE U. S. A.

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Looking for Insects

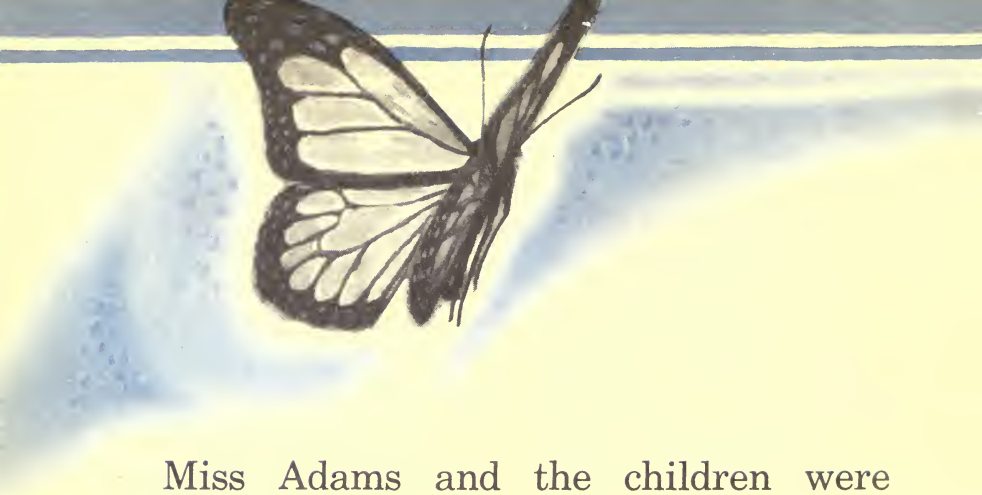
"Let's go on a field trip, Miss Adams," said Susan. "Let's look for things."

"We'll take Jane with us," said Nancy. Jane was a new girl in school.

"Jane doesn't know what fun field trips are," said Susan. "We look for things, Jane. We look for flowers and leaves and animals."

"Let's look for insects today," said Bob. "Our garden is full of insects."

"We'll take some glass jars. We can put insects into the jars," said Jimmy.



Miss Adams and the children were soon in Bob's garden.

"I see a butterfly!" shouted Jimmy. "A butterfly is an insect."

"I see it, too," said Susan. "And it's a Monarch butterfly! It looks just like the one we had in school last year."

"Isn't it pretty!" said Jane.

Nancy told Jane about the Monarch butterfly. "We had one last year. It came out of a chrysalis. The chrysalis was green. It was beautiful."

"The Monarch butterfly flew South for the winter," said Bob. "All Monarch butterflies fly away in autumn."

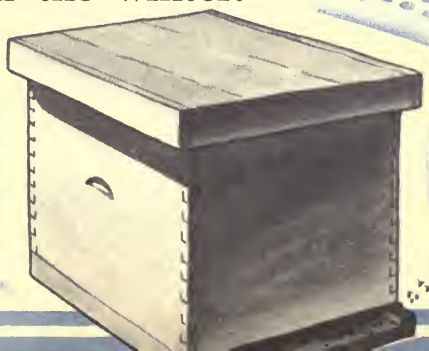
"B-z-z-z-z-z!" Something flew around Bob's head. "It's a bee!" he cried. "A bee is an insect, too!"

"There are lots of bees," said Susan. "They are buzzing around the flowers."

"The bees are getting food from the flowers," said Miss Adams. "They will make it into honey. They will put it into a hive. The hive is their home."

"Do they stay in the hive all winter?" asked Jimmy.

"Some of the bees die before winter comes," said Miss Adams. "The others stay in the hive all winter. They will eat the honey in the winter."



"Oh, see this beautiful caterpillar!" cried Susan. "It's black and green and yellow. It's on a milkweed plant."

"It's the prettiest caterpillar I ever saw," said Nancy. "Let's take it to school."

"You may," said Miss Adams. "The caterpillar is a young insect."

"Insect!" cried the children.

"Isn't it a worm?" asked Jimmy.

"No," said Miss Adams. "Worms have no legs. See, the caterpillar has legs. All caterpillars are young insects and not worms at all."

"What will it eat?" asked Susan.

"It will eat milkweed leaves," said Bob. "We'll put some milkweed leaves into the jar. We'll call this caterpillar our milkweed caterpillar."

"That's just what it is," said Miss Adams. "You have found a milkweed caterpillar."

"Oh! I see an insect," cried Susan. "Guess what it is, and guess where I see it!"

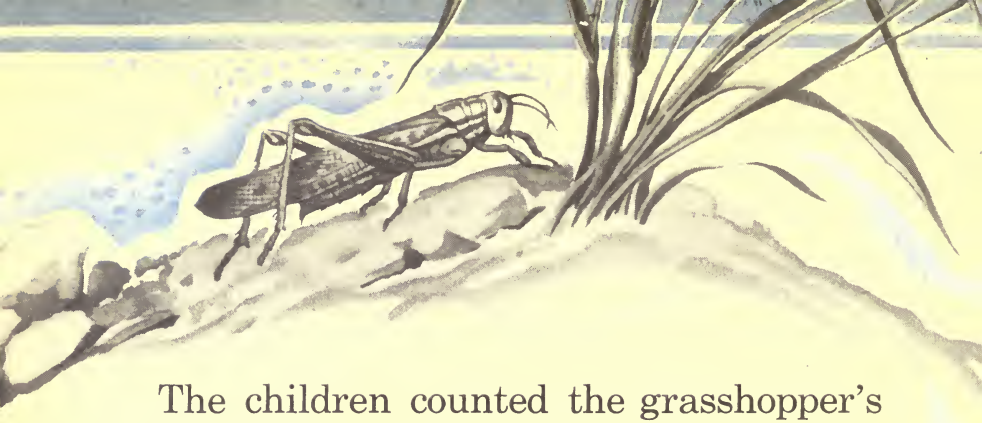
"I see it, too," said Nancy. "It's a grasshopper, and it's on Jane's dress!"

Jane laughed. She liked field trips.

Jimmy picked the grasshopper off Jane's dress.

"Look at it kick," he said. "All its legs are kicking."

"How many legs does it have?" asked Jane.



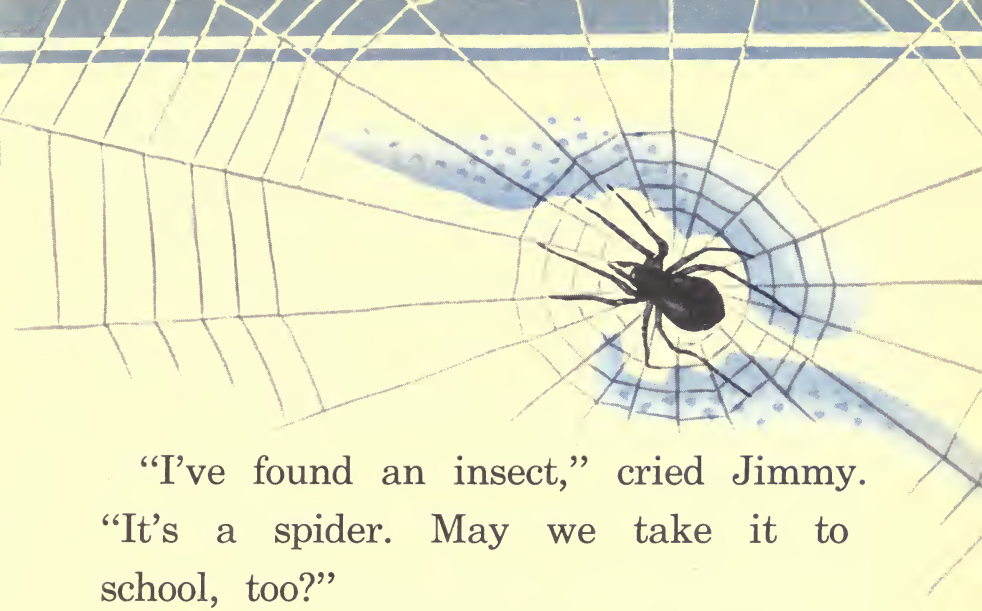
The children counted the grasshopper's legs.

"Six," said Bob. "A grasshopper has six legs."

"All insects have six legs," said Miss Adams.

"Shall we put the grasshopper into a glass jar?" asked Bob.

"If we leave it out of doors it will lay eggs," said Miss Adams. "Then it will die. Grasshoppers lay eggs late in summer. The eggs stay in the ground all winter. In the spring the eggs will hatch. Grasshoppers often eat crops. Farmers can get rid of grasshoppers if they dig up the eggs."



"I've found an insect," cried Jimmy. "It's a spider. May we take it to school, too?"

"Yes," said Miss Adams. "But a spider is not an insect."

The children were surprised.

Miss Adams held the spider in her hand. "How many legs does it have?" she asked.

The children counted the spider's legs. "It has eight legs!" said Bob. "The grasshopper had only six legs!"

"Insects have six legs," Miss Adams told the children. "Spiders have eight legs. Spiders are not insects."

Jane found a caterpillar.

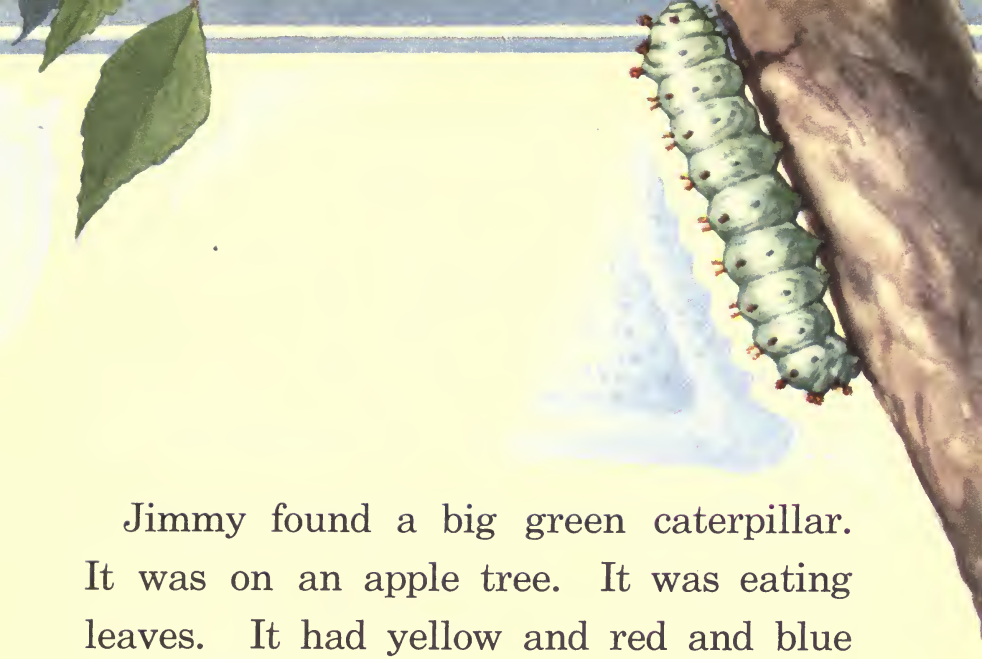
"See my caterpillar!" she called. "My caterpillar is beautiful, too. It's green and black. But it does not look like the milkweed caterpillar."

"It is another kind," said Miss Adams. "We call it a carrot caterpillar because it eats carrot leaves."

Miss Adams touched the caterpillar. Out came two orange horns!

"Oh!" cried the children. "It has horns! They are orange! Let's take this caterpillar to school!"

Bob put it into his glass jar. The children picked some carrot leaves. The caterpillar had to have something to eat.



Jimmy found a big green caterpillar. It was on an apple tree. It was eating leaves. It had yellow and red and blue on it.

"Let's take it to school," he said.

"Will this caterpillar spin a cocoon?" asked Susan.

"Yes, I think it will," said Miss Adams. "We will watch it."

Jimmy put the caterpillar into his glass jar.

"We'll feed it apple leaves," said Nancy. She put the apple leaves into the jar with the caterpillar.

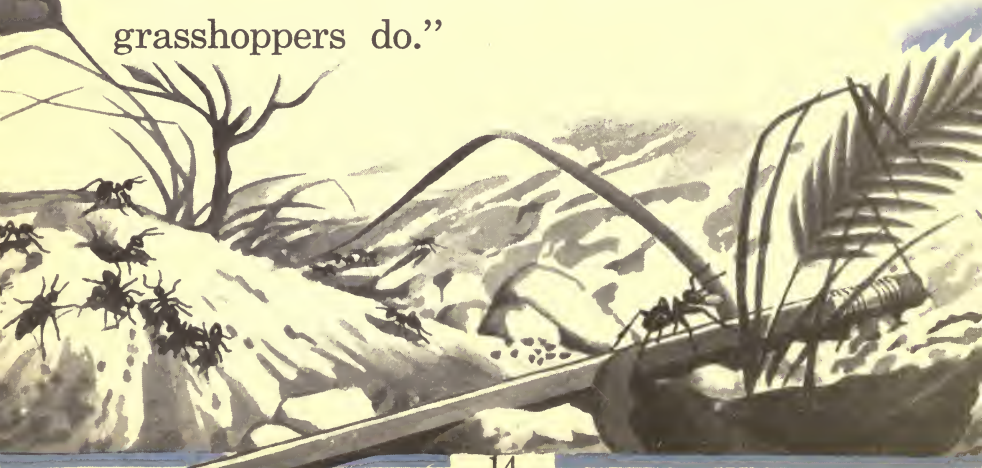
"Here's an ant hill!" cried Bob.

Many ants were going in and out of a large ant hill. Some of the ants were taking food into the hill.

Jimmy looked at one of the ants. He counted its legs. "An ant is an insect," he said. "It has six legs."

"Let's take some ants to school," said Jane.

But Miss Adams told the children it would be hard to keep ants in school. "Ants live together in the hill all winter. They dig holes under the ground. They do not die in autumn as grasshoppers do."



"Let's pick some goldenrod to take to school," said Nancy. "The flowers will make our room pretty."

Soon the children had their arms full of goldenrod.

"The flowers look like gold," said Jimmy.

Nancy held up a stem of goldenrod. "I thought goldenrod was all one flower," she said. "But look! There are many flowers together. What a lot of seeds the goldenrod will have!"

On the way back to school Jane said, "I like field trips. I like this school."

An Insect Home

Nancy was putting the goldenrod into a jar of water.

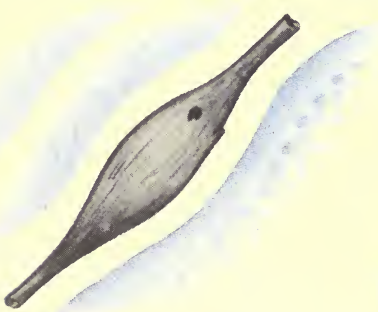
"This stem has a bump on it," she said. "Let's see what's inside."

All the children watched while Jimmy cut into the bump.

"There's a worm in it," said Nancy. "How did it get there?"

"It's a caterpillar," said Miss Adams. "The bump is a gall. A gall is one kind of insect home."

"A tiny moth laid an egg on this stem," Miss Adams told the children. "The egg hatched into a caterpillar. The caterpillar went into the stem. It made the goldenrod stem grow big. See, the caterpillar lives inside."



"Bumps like this one are insect galls," Miss Adams said. "If we had not cut into the gall, the caterpillar would have lived there all winter. Many plants have insect galls on them."

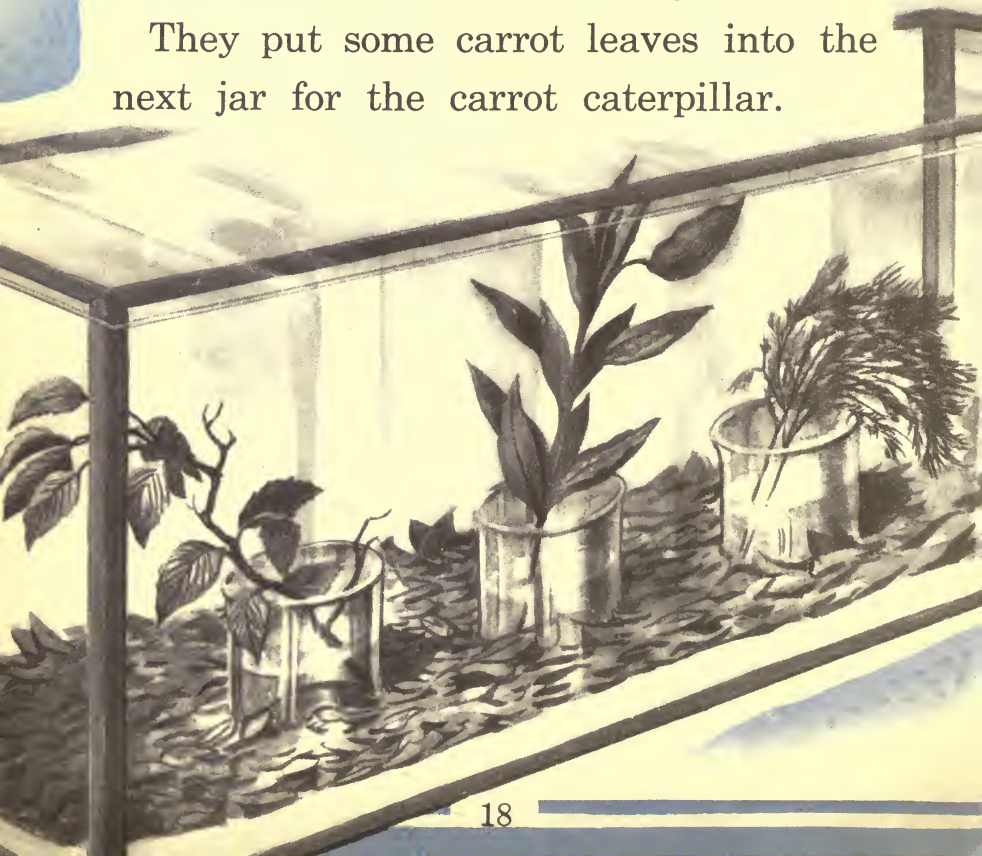
"Here's another gall," said Dick. "Let's put it into a glass jar and keep it. We can see the moth when it comes out next spring."

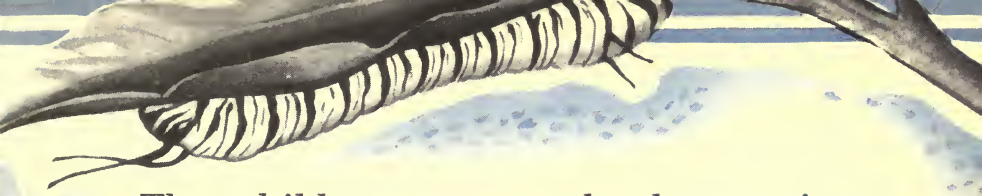
Three Caterpillars

The children made a home for their caterpillars. They put sand and dry leaves into a glass box. They put three jars of water into the sand. They put a stem of milkweed into one jar of water.

"The milkweed caterpillar will live on these leaves," said Jimmy.

They put some carrot leaves into the next jar for the carrot caterpillar.





The children put apple leaves into the next jar. That was where the big green caterpillar was to live.

Each day the children put fresh leaves into the jar.

One day the milkweed caterpillar was very still.

"It looks dead," said Susan.

But it was not dead. Something was about to happen to it.

Soon the caterpillar began to move. It crawled back and forth, back and forth, on the milkweed stem.

"It's upside down," said Jimmy.

"It is spinning a rug of silk," said Miss Adams. "Watch it work."

At last the milkweed caterpillar stopped spinning. It was still. The children were still, too.

All at once the caterpillar let go of the stem.

"Oh!" cried the children.

"Its head is hanging down," cried Jane. "It will fall."

But the caterpillar did not fall. It hung with its head down all day and night. The next day when the children came to school, it was still hanging.

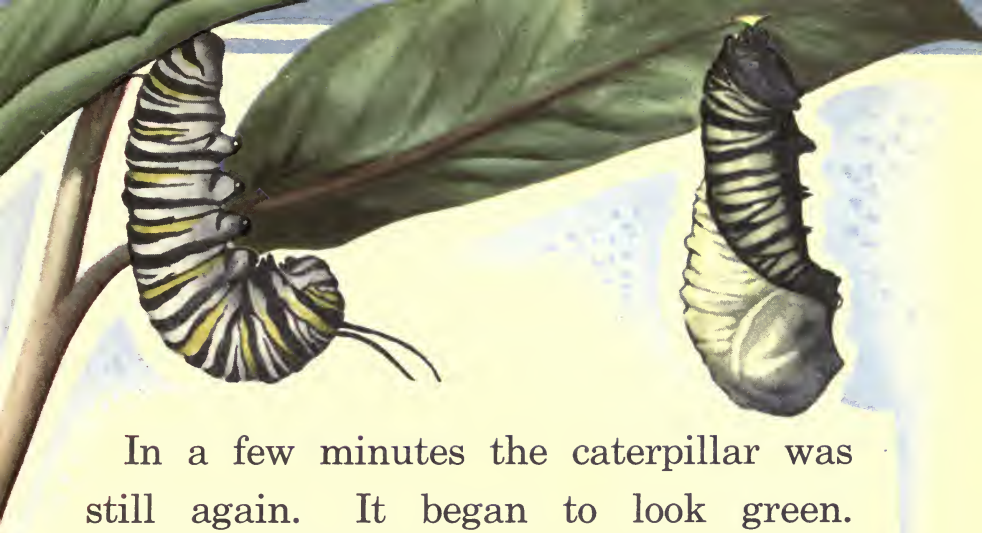
"Its pretty colors are gone. It is smaller, too," said Nancy. "Will it die?"

"No," said Miss Adams. "It will not die. Something else will happen to it."

The children watched. Soon the skin of the caterpillar broke open. The caterpillar wiggled! It wiggled its head!

"It's going to fall!" cried Jane.

But it did not fall. It just wiggled some more. It wiggled until it had pushed off its skin!



In a few minutes the caterpillar was still again. It began to look green. It was a light green. It was a shining green. It had little gold spots on it.

"It's a chrysalis!" said Bob. "It's just like the chrysalis we had last year. A Monarch butterfly came out of that chrysalis. A Monarch butterfly should come out of this one, too."

"The caterpillar with the orange horns is gone!" said Jimmy one day.

"Maybe it has made a chrysalis, too," said Susan.

It had! A brown chrysalis was hanging from a dry stem.

"It looks almost like the leaf," said Jimmy.

"Some birds would like to eat this chrysalis," said Miss Adams. "But it looks so much like the leaf that they can not see it."

"Let's keep the chrysalis and see what happens to it," said Nancy.

"Our big caterpillar is making a cocoon!" Bob cried. "Come and see!"

The big green caterpillar was at work. It was spinning silk threads. It fastened the silk threads to the box.

"The silk must be strong," said Nancy. "The caterpillar does not fall."

The caterpillar moved its head back and forth. It spun short silk threads like this:

The silk threads were white and shining.

All day long the caterpillar worked. The next day Nancy looked at it. "The caterpillar is gone," she said. "It's inside the cocoon."

"But look at the cocoon," said Bob. "At first it was white. Now it is brown. Say, look at it move!"

"The caterpillar is still at work," said Miss Adams. "It is still spinning inside the cocoon. The caterpillar is making the inside of its cocoon."

"Will it sleep all winter?" asked Nancy.

"Yes, it will sleep until spring," Miss Adams told her.

What Is It?

It has six legs.
It lays eggs in autumn.
Its eggs are in the ground.
What is it?

It is an insect home.
It is part of a plant.
It has a caterpillar inside it.
What is it?

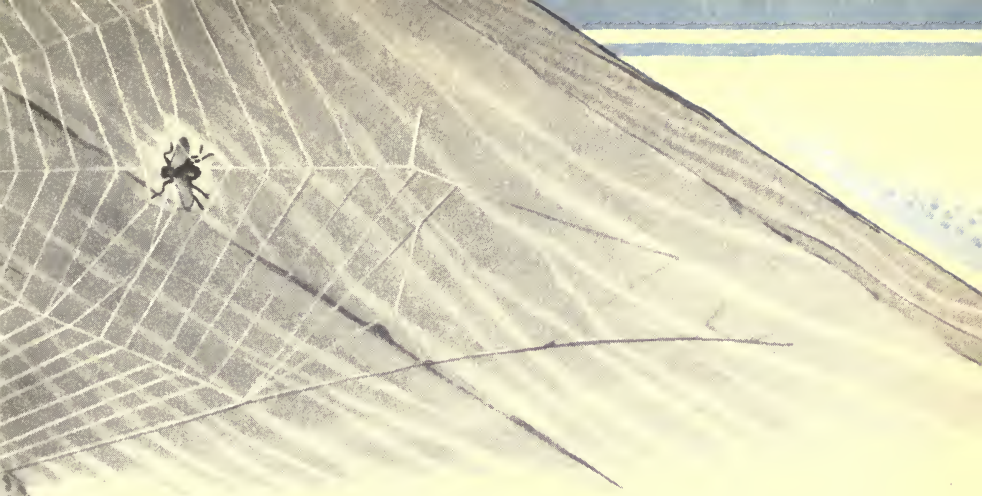
It is green.
It has gold spots on it.
A butterfly comes out of it.
What is it?

It is a caterpillar.
The caterpillar has orange horns.
The caterpillar eats carrot leaves.
What is its name?

Eight Legs

"Let's name our spider," said Jane. "Let's call it Eight Legs."

"All right," the children said. "And let's make a home for it."



They put sand into a box. They put Eight Legs into the box.

Miss Adams said, "Eight Legs needs food and water. Put some wet paper into the box. Then it can get water."

"What will it eat?" asked Jimmy.

"Give it flies or grasshoppers," said Miss Adams. "Spiders use many kinds of insects for food."

The children caught flies for Eight Legs. But in a few days Eight Legs had spun a web. When flies got into the web, they could not get out. Eight Legs was catching its own food!

Soon Eight Legs spun a silk rug on the sand in the box. Eight Legs laid some eggs on the rug. They were tiny white eggs. They were so tiny the children could hardly see them. Eight Legs made the silk into a bag. Inside the bag were her eggs. Around the bag she spun a brown cover.

In a few days Eight Legs died. Miss Adams told the children that all spiders like Eight Legs die in autumn.

"The eggs will live all winter," she said. "Next spring little spiders will come out of the bag."

Jane Plans an Aquarium

"Let's make an aquarium," said Jane one day. "We had an aquarium in our school last year. We had fish in it. We fed the fish and watched them eat. Our aquarium was fun."

The children liked Jane's plan. They wanted to make an aquarium.

Miss Adams found a large glass box.

"We'll put some clean sand into the box," said Jane. The children did this.

Then Jane said, "We must put pond water into the aquarium. We must get some water plants, too."

"Why do we need plants?" asked Nancy.

"We want to make the aquarium like the pond where fish live," said Miss Adams. "There are plants in the pond. Plants make the pond a better place for fish."

The children went to the pond. They filled their jars with pond water.

They found a plant in the water. It looked like grass.

"That is a good plant to put into an aquarium," said Miss Adams.

They found a plant that floated.

"It is duck weed," said Miss Adams. "You can put it into the aquarium, too."

The children took the water and the plants to school. They planted the water grass in the sand. They put little rocks around it to hold it in place.

"Now I'll show you how to pour in the water," said Jane. "We must be careful not to stir up the sand."

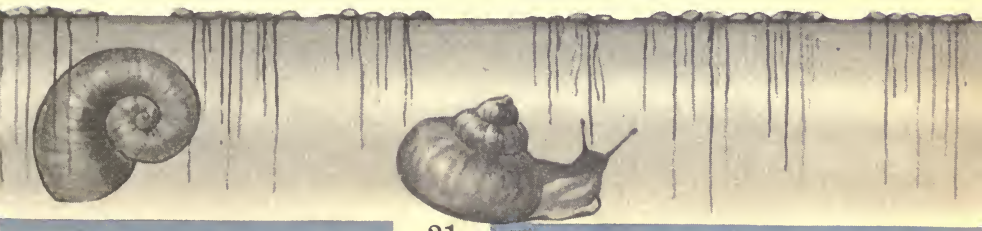
Jane put some paper on the sand. She poured the water on the paper. She did not stir up the sand. The paper floated to the top and she took it out.

Then she put the duck weed in the water. The duck weed floated.

"Now we have a good aquarium," said Jane. "As soon as the plants grow we can put in the fish. The plants must have roots or the fish will pull them up."

"When the plants grow, I'll bring a fish," said Bob. "I'll catch one."

"Oh, I forgot something," said Jane. "We must get some snails. Snails keep the sides of the aquarium clean."



In a few days the plants in the aquarium were growing. It was time to put in a fish. So Bob went fishing with his father.

Father caught a big fish. Bob caught a small one. It was a sun fish.

"It's very small," said Father. "You'd better put it back into the water."

"It's just right for our aquarium!" said Bob. "Please, may I keep it and take it to school?"

Father said he might keep it. Bob put the fish into a can of water.

Next day he took the fish to school. He put it into the aquarium.

"It has pretty colors," said Nancy.

"It's a sun fish," said Bob.

"I like to watch it swim," said Jane. "It slides through the water."

"How does it swim?" asked Susan.

"It has fins," said Jane. "It uses its fins and tail to help it swim. Its fins and tail help push it through the water."

The children watched the sun fish.

"It has scales on it," said Jimmy. "The scales cover its skin. A rabbit has fur. A bird has feathers. A fish has scales. The scales help to keep the fish from being hurt."

"The fish has funny eyes," said Jane. "They are always looking at us."

"The fish can't shut its eyes as we do," said Miss Adams. "Its eyes are always open. A fish can see in water."

"I can open my eyes in water," said Bob. "But I can't breathe in water. A fish can."

"Yes, fish breathe in water," Miss Adams told him. "Even in winter they breathe in the water under the ice."

"Don't they freeze?" asked Nancy.

"No," said Miss Adams. "Fish are able to live in very cold water."

"What do they eat?" asked Bob.

"They eat plants and small animals that live under the ice. But in very cold weather fish don't eat often."

"We must feed our sun fish," said Susan. "What shall we give it?"

"It will eat earthworms," said Bob. "I'll bring some earthworms for it."

Next day Bob put an earthworm into the aquarium. The sun fish shook it as a cat shakes a mouse. Then it ate the worm in one big mouth full!

The sun fish did not need much food. A worm every other day was just right.

Leaves in Autumn

Here are some pictures of leaves.
They fall from the trees in autumn.

Maple leaf

Oak leaf

Elm leaf

Poplar leaf

Nancy found some pretty leaves.
Can you name the leaves she found?

Trees

Trees are big plants. They grow from seeds.

A tree has many parts. It has a trunk. The trunk is the biggest part of a tree.

A tree has branches. Some of the branches are big. Some of the branches are little.

A tree has leaves. In summer most tree leaves are green. In autumn some tree leaves change color. They turn red and yellow.

Some tree leaves fall off in autumn. They fall off because the tree stops growing.

A tree has new leaves every spring.

We can not see all of a tree. We can not see the roots of a tree because they are under the ground.

A tree has many roots. It has almost as many roots as it has branches. The roots get water and food for the tree. The water and food make the tree grow. The roots also hold the tree in the ground. If the wind blows, the roots keep the tree from blowing over.

If you could see the roots, they would look like the picture.

Trees are beautiful. They help make school grounds and houses look pretty.

Trees make shade in the summer. They shade your house. They keep your house cool. They keep you cool, too.

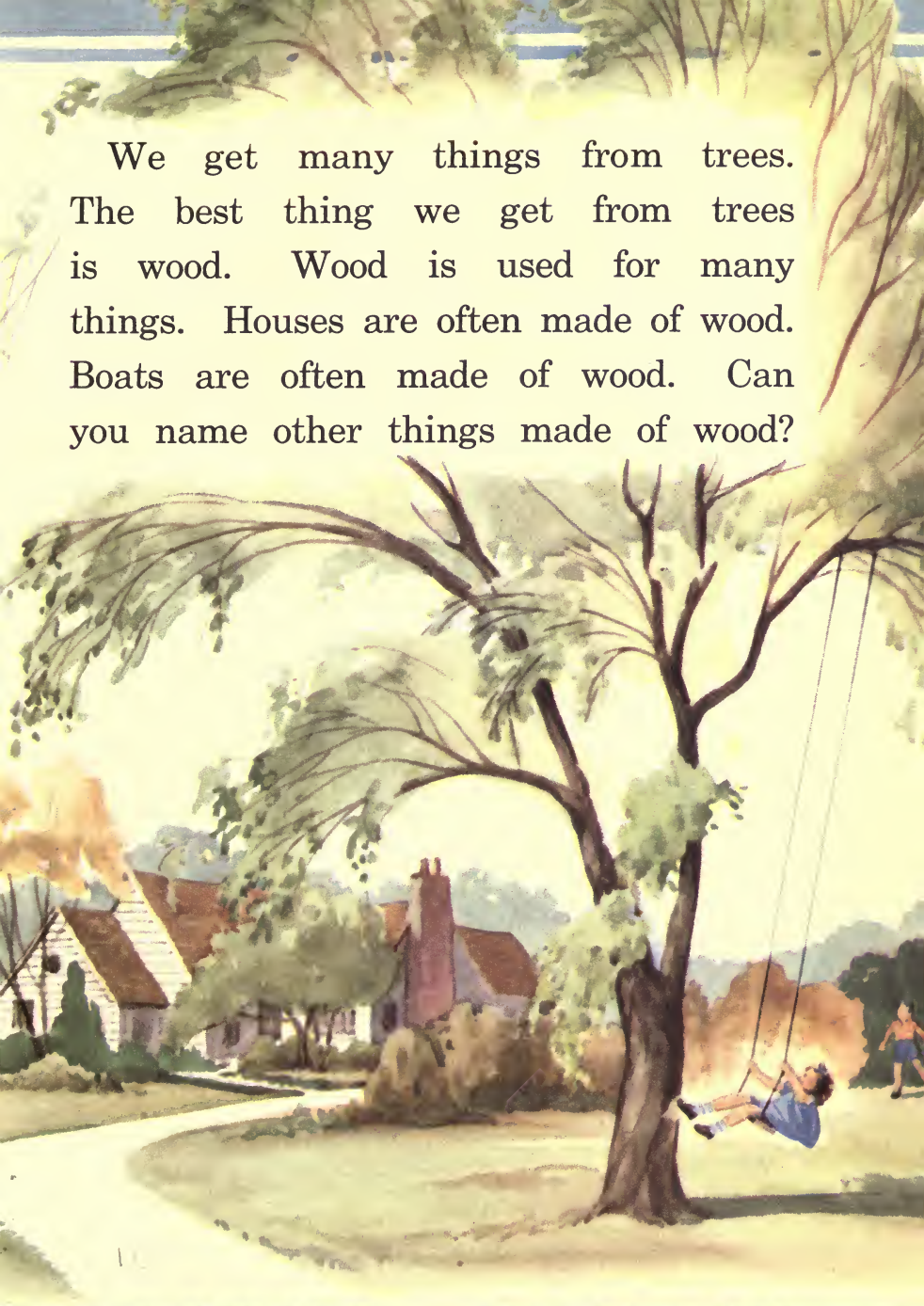
Trees make good play houses. It is fun to play under a tree. It is fun to swing from a tree branch.

Trees are homes for birds.

Some trees have fruit on them that we eat.

Apples grow on trees. Oranges grow on trees. Can you name other fruits that grow on trees?

We get many things from trees. The best thing we get from trees is wood. Wood is used for many things. Houses are often made of wood. Boats are often made of wood. Can you name other things made of wood?



How Seeds Are Scattered

Soft white things were floating about the school room.

"What are they?" asked Susan.

"They are milkweed seeds," said Jimmy. "They must have come from our milkweed. Don't you remember the milkweed we brought for the caterpillar?"

The children looked at the milkweed in the glass jar. The pod on the stem was dry. It had popped open.

Susan looked at the pod.

"The seeds came out of the pod," she said. "Feel how soft the inside is! It is as soft as velvet!"

Bob caught some seeds in his hands.

"The seeds are soft, too," he said. "They feel like feathers."

"Milkweed seeds have plumes. Do you see them?" asked Miss Adams as she held one in her hand. "The plumes help the seeds float in the wind. This is one way that seeds are scattered."

"Dandelion seeds have plumes, too," said Nancy. "The wind blows them everywhere. They fall on the ground and stay there all winter. In the spring they grow into plants."

"Yes," said Miss Adams. "The wind scatters many seeds. Animals scatter seeds, too. Have you seen them?"

"I've seen squirrels carry away nuts," said Jimmy. "Nuts are seeds."

"Birds scatter seeds, too," said Susan. "They take seeds to new places."

"My dog scatters seeds," said Bob. "Burrs stick to his fur. Burrs are seeds. Sometimes they stick to my dog and I have to pick them off."

"Water scatters seeds, too," said Miss Adams. "Sometimes seeds fall into water. They float to their new homes in the water."

Seeds have many ways of getting to their new homes.

Some seeds have wings.

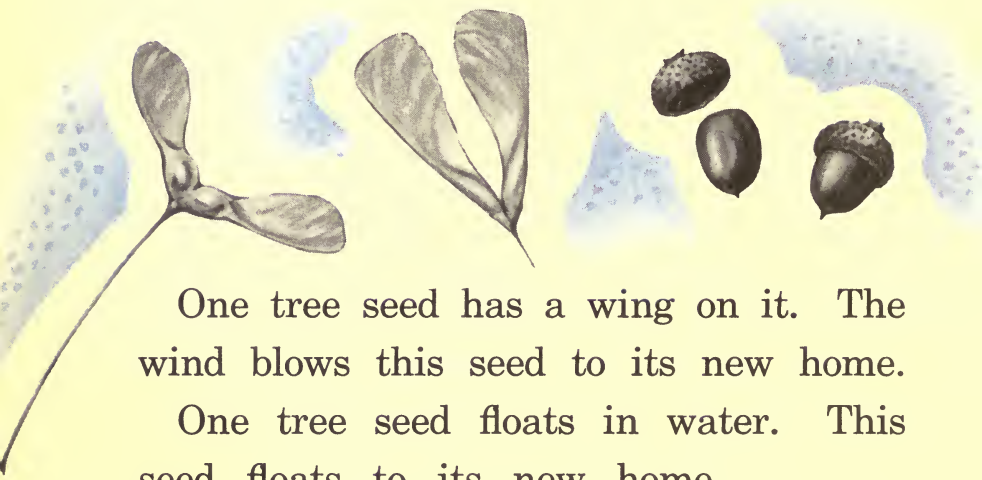
Some seeds float in water.

Some seeds have plumes. The wind blows them.

Animals carry some seeds.

Trees grow from seeds. Each tree has its own kind of seed. Some tree seeds fall from the tree in spring. Some tree seeds fall in autumn.

Here are three tree seeds that fall in autumn.



One tree seed has a wing on it. The wind blows this seed to its new home.

One tree seed floats in water. This seed floats to its new home.

One seed falls to the ground where it stays if some animal doesn't carry it away.

Which tree seed do you think flies?

Which tree seed do you think floats?

Which tree seed stays on the ground?

A Long Root

Jimmy was helping his father dig dandelions. He dug and dug but the dandelion roots were very long.

"Why do dandelions have such long roots?" he asked.

"The roots have food in them," said Father. "The food makes the leaves stay green. Dandelions live all winter. But the winter leaves are not like the summer leaves. The winter leaves grow close to the ground."

A Bird Field Trip

"Look at the little yellow birds," said Nancy. "They have black caps and black wings."

The garden was full of small yellow birds. They looked like yellow flowers as they sat on the stems of plants.

"What kind are they?" asked Jimmy.

"They are goldfinches," said Miss Adams. "The goldfinch is one of our prettiest birds."

"Their feathers look like gold," said Jane. "They shine in the sun."

"Why do birds have feathers?" asked Susan.

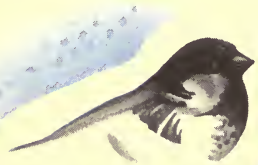
"Feathers cover their skin. Feathers keep the birds warm," said Jimmy. "Scales cover fish. Feathers cover birds."

"Feathers help birds fly," said Bob.

"Birds have wings to help them fly," said Susan. "They can fly a long, long way. Some birds fly away for winter."

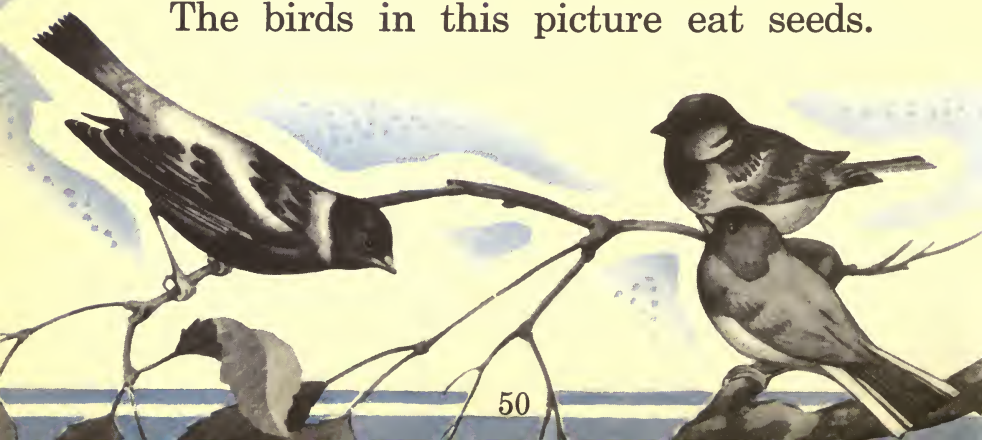
"Look!" said Jane. "The goldfinches are eating seeds."

"Goldfinches are seed eaters," said Miss Adams. "They have short, thick beaks. Most birds with short, thick beaks eat seeds. We call them seed eaters."

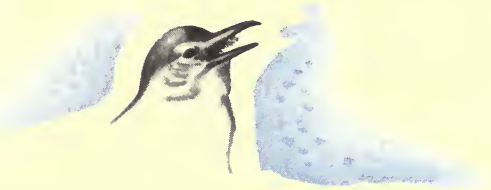


"Sparrows have short, thick beaks," said Susan. "They must be seed eaters."

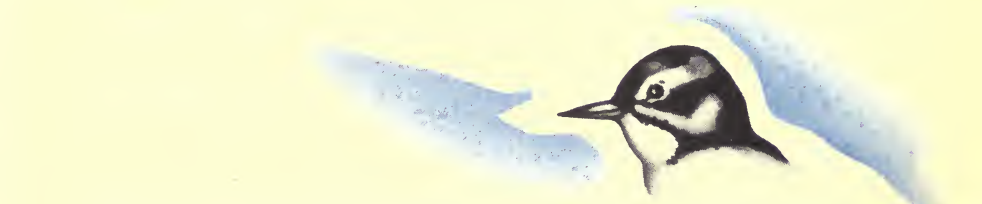
The birds in this picture eat seeds.



"Most birds that eat insects have pointed beaks," said Miss Adams.



"A downy woodpecker has a pointed beak," said Bob. "It eats insects."



"A downy woodpecker eats insects that live under the tree bark," said Jimmy. "Its beak helps it get the insects."

The birds in this picture eat insects.

"Look! There is a bird's nest," said Bob, pointing to a tree. "I'll get it."

"Oh, no, you must never take a bird's nest," said Jane.

"It's all right to take a nest in autumn," Susan told Jane. "The birds have gone away. They will not use the nest again."

"I think it's a robin's nest," said Bob as he came down from the tree.

"It's round," said Susan. "Robins make round nests."

"It's made with mud," said Nancy. "Robins use mud to make the grass and string stick together."

"You are right, children," said Miss Adams. "It is a robin's nest. You may take it to school."

"I know where there's another nest," said Jimmy. "It looks like a basket."

The children went with Jimmy. There was the nest. It was hanging from the branch of a tree.

"It's an oriole's nest," said Bob. "Orioles make nests like baskets."

The children looked up at the nest.

"It is gray," said Nancy.

"It looks soft," said Susan.

"Orioles often use milkweed stems to make their nests," said Miss Adams. "They tear the milkweed stems into strings. The milkweed strings are very strong."

"The milkweed strings make strong nests," said Bob. "The nests have to be strong to hang like baskets."

Which Is Right?

1. Which animal has fins?
   spider moth sun fish
2. Which plant will grow in an aquarium?
   goldenrod duck weed milkweed
3. Which animal has eight legs?
   grasshopper ant spider
4. Which seed has a plume on it?
   milkweed maple bean
5. Which animal has feathers?
   fish bird dog
6. Which animal makes a nest?
   robin moth butterfly
7. Which bird eats seeds?
   woodpecker goldfinch chickadee
8. Which insect makes honey?
   ant bee grasshopper
9. Which animal can live in an aquarium?
   moth snail oriole

Jimmy's Surprise

One day Jimmy had a surprise for the children. He had something in a can.

"Guess what it is," he said. "It's an animal. It's long and it crawls."

"It's a snake!" cried the children.

"No, it is not a snake," said Jimmy.

"It's an earthworm!" said Bob.

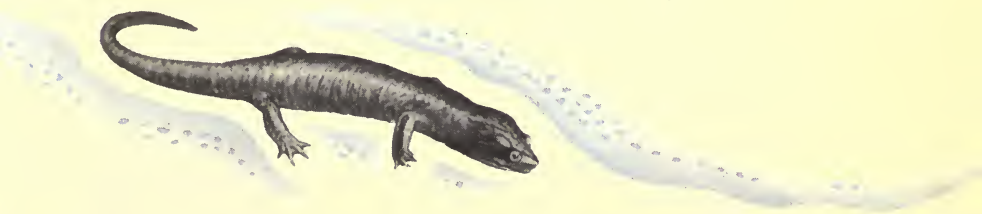
"No, it is not an earthworm," said Jimmy. "Guess again."

But the children could not think of another animal that crawled.

"We give up," they said.

Jimmy showed them his surprise.

It had short legs on a fat body. Its tail was long and thin.



"What is it?" the children asked.

"It is a salamander," said Jimmy. "It was in the woods. It was under a log."

"Is a salamander a snake?" asked Bob.

"No, a salamander is not a snake," said Miss Adams. "It is more like a toad or a frog. Salamanders and toads and frogs are alike in many ways. How does the skin of the salamander feel?"

"It feels smooth," said Susan.

"Salamanders and toads and frogs have smooth skins," said Miss Adams. "Snakes have scales on their skins. Salamanders and toads and frogs can not turn their heads."

"It was hard to see the salamander," said Jimmy. "It looked like the ground."

"Yes," said Miss Adams. "It looks so much like the ground it can hide."

"Some frogs look like the ground, too," said Bob. "I tried to catch a frog. It jumped and then I couldn't see it."

"Toads look like the ground. I almost stepped on a toad," said Nancy. "It was in the garden and I didn't see it."

"Does a salamander always live in the woods?" asked Susan.

"A salamander lives part of its life on land. It always lives near water," Miss Adams told the children.

"Where does it live in winter?" asked Jimmy.

"It hibernates," said Miss Adams. "So do toads and frogs."

"What did you say?" asked Susan.

Miss Adams laughed. "It is time for you to use the right word. When animals sleep all winter, we say they hibernate. They go into the ground or into a log or a tree. They do not need to eat until spring. They hibernate."

The children liked the new word.

"Woodchucks hibernate," said Jimmy. "So do turtles and snakes. Maybe this salamander was going to hibernate. It must be funny to sleep so long and not have anything to eat!"

Jimmy took the salamander back to the woods. "Now you can hibernate," he said.

A Funny Animal

Rita and Pablo are Mexican children. They live where it is warm all year. They live where it does not rain often. The ground is very dry.

"Look there!" cried Pablo. "The grass is moving! There's something in the grass."

Rita's sharp eyes saw it first. It was a little gray and brown animal. It looked almost like the dry ground.

It turned its head and looked right at Rita. Its eyes were almost as bright as Pablo's. It was not afraid of the children.

"It's a horned toad," said Pablo. "Horned toads make good pets. Let's take it to school."

Pablo put the horned toad into a box and took it to school.

"I know some children who would like to see a horned toad," said his teacher. "They live in a place where winters are cold. They live where it rains often. They live where there are beautiful trees and flowers and grass. But they have no horned toads."

"Let's send the horned toad to them," said Pablo. And so they did.

They wrote a letter, too. Here it is.

Dear Children,

This is a horned toad. We found it near our school. It was on the sand. It looked like the sand. It was hard to see. We hope you like it. Feed it insects. It will be a good pet.

Rita and Pablo

The children were excited. Miss Adams had a box for them. She opened it. Out popped a little animal with bright eyes! It looked at the children.

"O-o-o-oh!" cried Jane. "What is it?"

"Here is a letter," said Miss Adams. "We will see what it says. It is from Rita and Pablo. They are the Mexican children who sent the animal to you."

Jimmy read the letter to the children.

"A horned toad is a funny animal," said Jane. "It doesn't look like a toad."

Next day Jane said, "Let's send Rita and Pablo a letter. Let's thank them for the horned toad."

This is the letter the children sent.

Dear Rita and Pablo,

Thank you for the horned toad. We like it. We put it in some sand in a glass box. We fed it insects.

It is not really a toad. It has scales. Toads have smooth skins. The horned toad can turn its head. Real toads can't turn their heads. We had a salamander. It couldn't turn its head, either.

Toads and salamanders hibernate. Do you know what hibernate means? The animals sleep all winter. We think the horned toad will crawl into the sand and hibernate, too.

Jane, Susan, Nancy, Bob, and Jimmy

Bob's Pets

Bob had some pets at home. He had a dog and a cat and two white rabbits. He asked the children to come and see them.

"Let me hold a rabbit," said Jane. "I like rabbits. I like their soft fur."

"Their fur is thick now," said Bob. "It will keep them warm this winter. Here, Jane, is one of the rabbits. Be careful! It has sharp claws!"

Jane knew it! The rabbit had hurt her arm. She dropped it in a hurry.

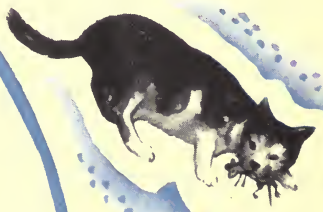
"I'm sorry," said Bob. "Rabbits have very sharp claws. They use their claws to dig in the ground."

"They have sharp teeth, too," said Jimmy. "Rabbits gnaw with their teeth. They gnaw young trees."

"Look!" said Susan. "Your rabbits are gnawing carrots now."

"Yes," said Bob. "My rabbits gnaw vegetables and young trees. They do not eat meat. Their teeth are not the kind for tearing meat."

"Dogs and cats can eat meat," said Nancy. "They have the kind of teeth that can tear food."

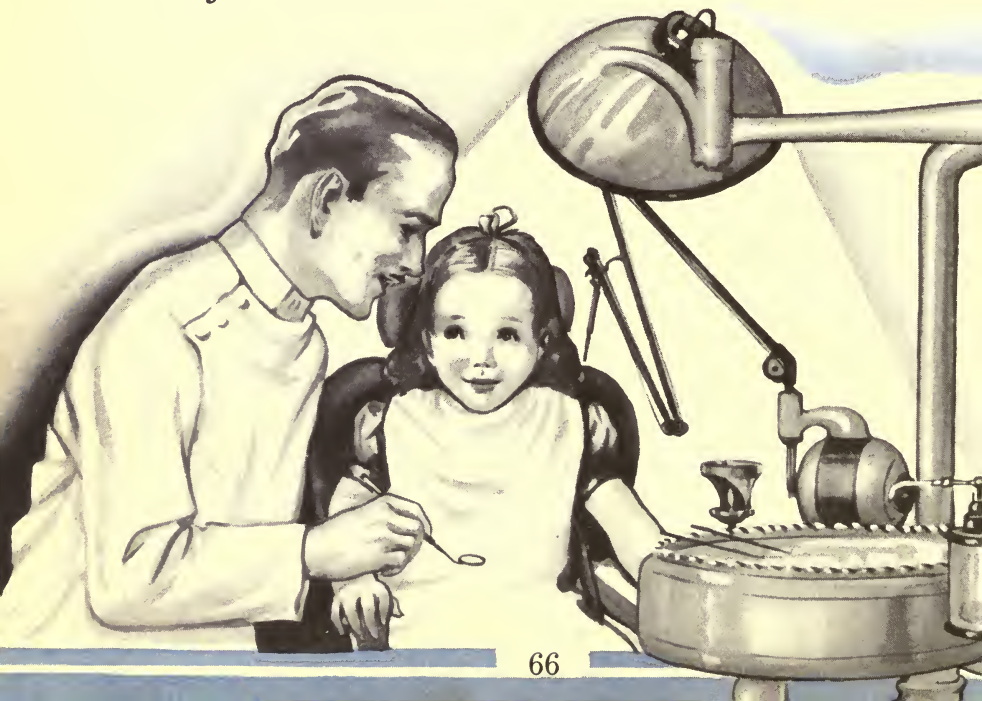


Susan's Teeth

"What has happened to your teeth, Susan?" asked Jimmy one morning.

"The dentist pulled them," said Susan. "He pulled four baby teeth. They were loose. Look! I have some new teeth coming where my baby teeth were."

"I have some new teeth, too," said Nancy. "The dentist told me to brush my teeth. He said to brush them every day."



"The dentist told me not to leave food between my teeth," said Susan.

"I had a hole in one of my teeth," said Bob. "It hurt! The dentist filled the hole. Then it didn't hurt any more."

"I have a loose tooth," said Jimmy.

"You should go to the dentist and let him pull it," said Susan.

"It would hurt!" said Jimmy. "I don't want it pulled."

The children were sorry for Jimmy. His new teeth would not grow in right.

But guess what happened to Jimmy that very day! He bumped into a door—and out came his tooth!

"Look!" he cried. "My baby tooth came out! And it didn't hurt at all!"

Can You Find Them?

1. Find the animals that have scales.
2. Find the animals that have fur.
3. Find the animals that have feathers.
4. Find the animals that have smooth skins.

Where Did the Water Go?

"This morning I saw water on the grass," said Nancy. "Was it rain?"

"No, it was dew," Miss Adams told her. "Dew is water, too."

"Dew is pretty," said Nancy. "Dew sparkles when the sun shines on it."

"The grass is dry now," said Susan. "Where did the dew go?"

"Maybe it went into the air," said Jimmy. "Dew is water and water goes into the air. Don't you remember?"

"Oh, yes, now I remember!" said Susan. "Heat makes water go into the air. The sunshine is warm. It made the dew go into the air."

"That is right," said Miss Adams. "When water goes into the air, we say it *evaporates*. Dew evaporates. It goes into the air."

"That's a new word," said Jimmy. "I like to say evaporate! Is it right to say the water on the sidewalk evaporates?"

"Yes," said Miss Adams. "The water evaporates when anything dries."

"My doll's clothes dried," said Jane. "I washed them and hung them out of doors. They dried fast. Did the water evaporate?"

"Yes, it did," said Miss Adams. "Your mother's clothes dry when she hangs them out of doors. The water evaporates."

"Blackboards dry after we wash them," said Bob. "Does the water evaporate?"

"Yes," said Miss Adams. "The heat in the room makes the water evaporate. Water evaporates when your rubbers and raincoat dry. Water evaporates if you just let it stand in a pan."

The children looked for dew each morning. One morning they could see no dew. The ground was white. The trees and bushes were white, too. They sparkled in the sunshine.

"Why do the trees sparkle?" asked Nancy.

"Frost makes them sparkle," said Jane.

"What is frost?" asked Susan.

"Frost is frozen water," said Miss Adams. "There was water in the air. When it turned cold last night, some of the water froze on the trees and bushes."

"Will it go away like the dew?" asked Susan.

"Yes," said Miss Adams. "The frost will melt and the water will evaporate."

"It looks almost like snow," said Bob.

"Frost is something like snow," said Miss Adams. "Shall we look at the frost through a reading glass?"

"Oh, yes!" the children cried. They put on their coats and ran outside. They looked at the frost through the reading glass.

"The reading glass makes the frost look pretty," said Susan. "The frost is as pretty as snowflakes."

Colder Weather

The children came in from play. They had red cheeks. They were cold.

"Let's look at the thermometer," said Jimmy. "The red line must be short."

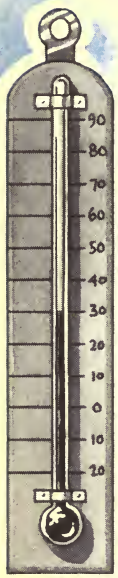
The children went to the window. They looked at the thermometer outside.

The red line was very short.

"Is it zero?" asked Nancy. "Sometimes my father says it is zero. What is zero?"

"I will show you," said Miss Adams.

She showed the children a place on the thermometer where there was a zero.



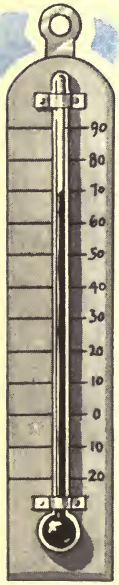
"We read the thermometer above zero or below zero," Miss Adams said. "The red line may be above zero or it may be below zero. Where is it today?"

"It is above zero," said Jimmy.

"How much above zero?" asked Miss Adams.

Jimmy counted. "The red line is at 30 above zero," he said.

"Yes," said Miss Adams. "That means it is 30 above zero out of doors today."



Then the children wanted to read the thermometer that was hanging inside the school room.

"It is warm in the school room," said Susan. "The red line is long."

Jimmy counted again. "The red line is at 70 above zero," he said.

"70 above zero is about right for a school room," said Miss Adams.

The children kept a record of the weather for a week.

This is what they wrote.

Monday

This morning there was dew on the grass. It evaporated when the sun rose.

Tuesday

Today we had rain. The clouds were dark before it began to rain.

Wednesday

The sun is shining. It is 50 above zero today.

Thursday

The wind is blowing. It is colder today. It is 40 above zero.

Friday

Last night we had a frost. Today is very cold. We are glad many animals are hibernating. They won't feel the cold.

Jimmy Learns Something New

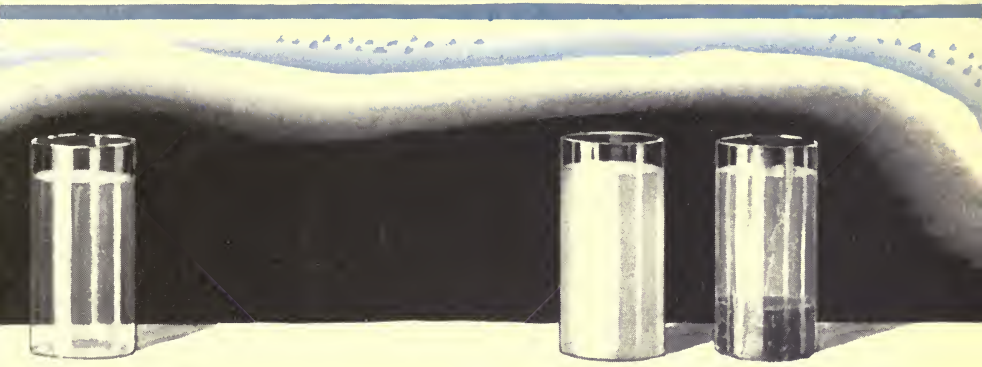
Jimmy was eating his supper. He spilled some sugar. It fell into his glass of water.

"Look, Mother," he said. "The sugar is gone. What happened to it?"

"The sugar went into the water," said Mother. "It dissolved."

"The water is sweet," said Jimmy as he tasted it. "The sugar made the water sweet. The sugar must be in the water. But I can't see it."

"No, you can't see it," said Mother. "The sugar dissolved in the water."



"Will other things dissolve in water?" asked Jimmy.

"Yes," said Mother. "Try some salt."

Jimmy put some salt into water. The salt dissolved. Jimmy tasted the water.

"It tastes like salt," he said. "The salt is in the water, but I can't see it."

Jimmy put some flour into water.

"The flour won't dissolve," he said. "I can still see the flour in the water."

"Some things do not dissolve," said Mother. "Flour does not dissolve."

Jimmy tried sand. It did not dissolve.

"I'm going to tell the children at school about the things that dissolve," he said.

Next day Jimmy told the children, "Some things dissolve in water. Some things do not dissolve."

"Let's see," said Bob. "Let's try to dissolve some things."

They put salt into water. It went into the water. It dissolved. It was in the water but no one could see it.

"Let's try some sugar," said Susan.

The sugar dissolved. Then they tried flour. The flour did not dissolve. It made the water look white. The children tried to dissolve some sand. But the sand went to the bottom of the glass. It did not dissolve.

"Let's boil the salt water," said Miss Adams. "Let's see what happens."

The children watched the water boil away. When it was gone, Susan said, "The water has evaporated."

The children looked in the pan. They saw something white.

"What is it?" asked Nancy.

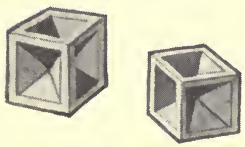
"Wait until it is dry," said Miss Adams. "Then you can find out."

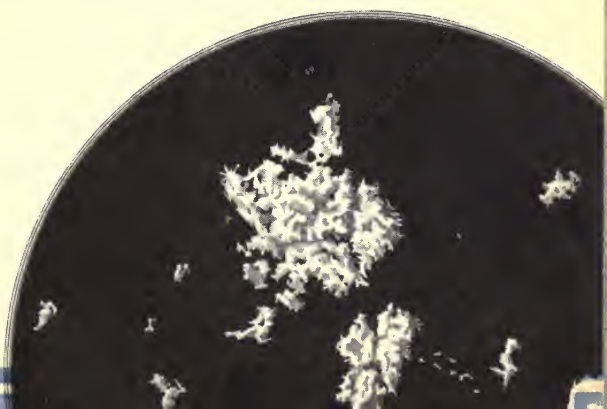
The children waited. Then Nancy tasted what was left in the pan.

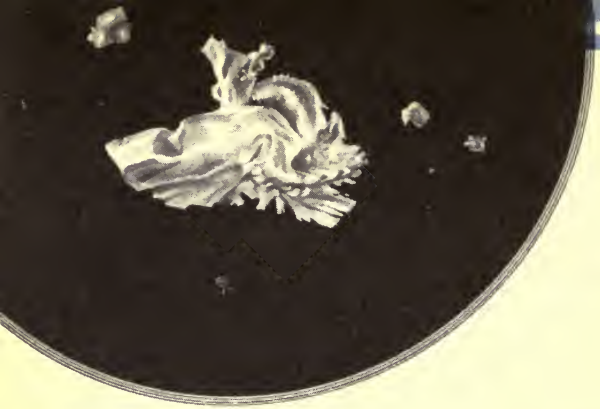
"It's salt!" she cried. "We have our salt back again!"

"Yes, these are salt crystals that you see in the pan," said Miss Adams. "The crystals were made when the water evaporated. Let's look at the crystals through a reading glass."

The salt crystals looked like these.







The children boiled the water with the sugar in it. When the water was gone, there was the sugar! It was in crystals, too. The sugar crystals looked like this.

"They do not look like salt crystals," said Bob.

"Crystals are made in patterns," said Miss Adams. "Salt crystals have one pattern. Sugar crystals have another."

"Frost has a pattern," said Jane. "Frost must be made of crystals."

"Snowflakes must be crystals, too. They have a pattern," said Nancy.

"Yes," said Miss Adams. "Frost and snow are made of water crystals."

Evergreen Trees

Some trees stay green all winter. They are called evergreen trees. They have green leaves all year long.

Many evergreen leaves are pointed. They are sharp like needles. Sometimes evergreen leaves are called needles.

Evergreen trees have straight trunks. Their branches are close together. Their branches make good homes for winter birds. They keep out wind and snow.

Evergreen trees have cones. Seeds are in the cones. The cones fall to the ground. Sometimes squirrels eat the seeds. Children like to pick up cones. They like to make fires with them.

Evergreen trees make good Christmas trees.

"A Christmas tree should always be an evergreen tree," said Mr. Brown.

Mr. Brown had a store. The children were buying a Christmas tree from him.

"I have two kinds of evergreen trees." said Mr. Brown. "Here is a pine tree. Its needles are fastened together in bundles."

"This is a fir tree. Fir needles are flat. They are not pointed. They are not fastened together in bundles."

"How good the leaves smell," said Jimmy. "Let's buy the fir tree."

"Fir trees make the best Christmas trees. They keep their needles longer than other evergreens," said Mr. Brown.

The children bought the fir tree. It made a beautiful Christmas tree.

Vegetables

Which vegetable do you like best?

Nancy likes cabbage best.

Bob likes beans best.

Jimmy likes corn best.

Susan likes lettuce best.

Jane doesn't know which vegetable she likes best. She likes them all.

Miss Adams says, "Vegetables are good for you. They help make you strong. They help keep you well. You should eat vegetables every day."

Jimmy eats vegetables every day. His mother knows what a boy should eat. She knows *how* a boy should eat, too. This is what she says:

"Always be on time for meals.

"Wash your hands before you eat.

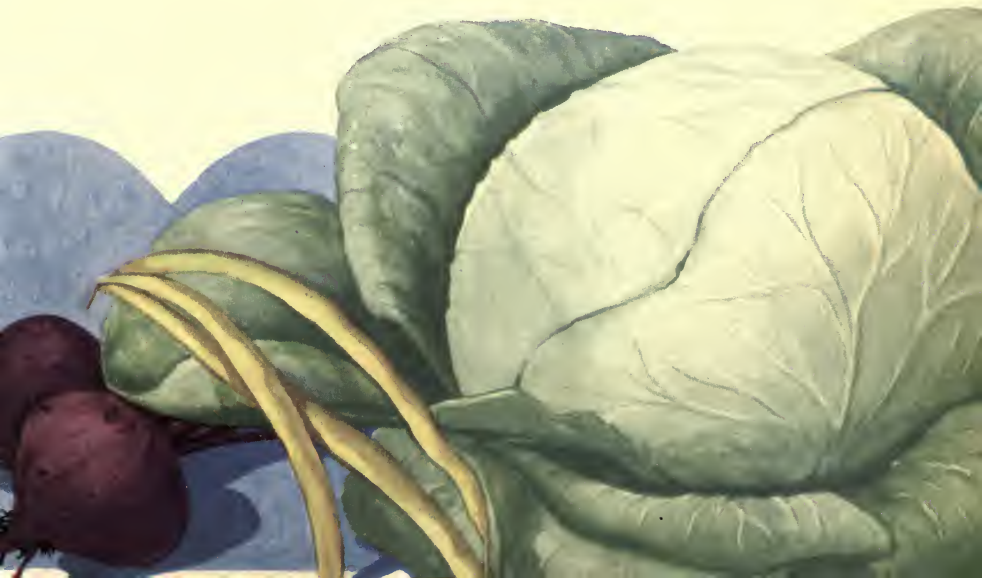
"Eat slowly.

"Chew your food well.

"Don't eat too much.

"Don't play hard right after eating.

"When you have candy, eat it right after meals."



Christmas Toys

The children got many new toys for Christmas. One day they brought their toys to school. There were all kinds of toys. Bob's toy was an electric train.

"Let's see it run," said Jane.

"How do you start it?" asked Nancy.

"This way," said Bob. "See this little thing? It is a switch. When I push it down, the train starts."

Bob pushed the switch down. The train started. It went faster and faster. It whizzed around the track.

"Whee-e-e! Look at it go!" shouted Jimmy.

"What makes it go?" asked Nancy.

"Electricity makes it go." Bob told her. "When I pushed the switch down, I turned on the electricity. The electricity makes it go."

"How do you stop it?" asked Susan.

"See, I pull the switch up," said Bob. "That turns the electricity off. Then the train stops."

"May I run the train?" asked Jane.

"Yes," said Bob.

So Jane pushed the switch down and away whizzed the train. She pulled the switch up and the train stopped.

The children had fun with Bob's train.

"I have an electric stove," said Susan. "My electric stove turns on and off. When I turn it on, it gets hot. Then I can cook on it. I can turn it off, too. When I turn it off, the electricity stops. It won't cook."

"I have an electric iron," said Jane. "I can turn it on and off. When I turn it on, it gets hot. I iron my doll's clothes with my electric iron. My iron uses electricity."

"There's something in this room that uses electricity," said Miss Adams. "It turns on and off. What is it?"

"I know," said Jimmy. "It's the electric light. It turns on and off."

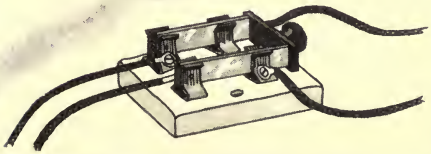
"How does electricity work?" asked Jane.

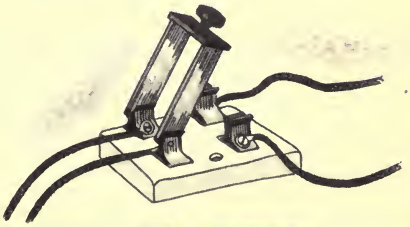
"Electricity must have two wires," said Miss Adams. "It comes in on one wire. It goes out on another wire. It goes round and round. If it can't go all the way around the wires, it won't work."

"My stove has two wires," said Susan.

"My train has two wires," said Bob.

"That is right," said Miss Adams. "All electric things must have two wires. The electricity comes in on one wire. It goes out on another."





Jimmy's toy was a large magnet. He showed it to the children.

"My magnet can pull iron and steel things," he said. "It can do something else, too. I will show you."

He took out his knife. He rubbed the blade with the magnet. He put down the magnet. He put the blade near a needle. It pulled the needle.

"Your knife is a magnet," said Bob. "It can pull things."

"I made it into a magnet," said Jimmy. "I made it into a magnet when I rubbed the blade with my big magnet."

Miss Adams gave each one a magnet.

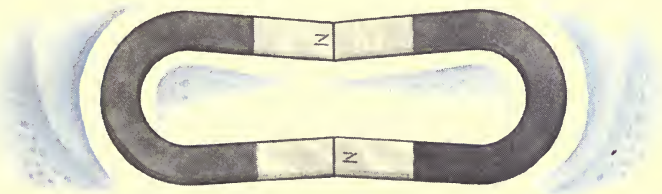
Jimmy put his magnet near Bob's. The magnets pulled each other. It was hard to pull them apart.

Nancy and Susan tried the same trick. Their magnets did not pull each other.

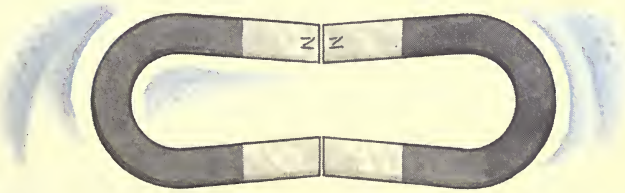
Miss Adams told them why. "One end of each magnet has an N on it," she said. "The other does not. Do you see?"

The children looked at their magnets. Each magnet had an N on one end.

Bob and Jimmy had put their magnets together like this. The magnets pulled.



The girls had put their magnets together like this. They did not pull.



Round About Us

"Hands can feel it but eyes can't see it, round about us everywhere," said Miss Adams. "What is it?"

The children had to think for a long time. Jimmy was the first to guess what it was.

"It's air!" he said. "We can feel it. We can't see it. It's all around us."

"We would die without air," said Susan. "Last year some of our toads died. They couldn't get out of the water to get air. Toads need air to live."

"All animals need air to live," said Miss Adams. "Water has some air in it, but toads can not use it. Can *you* use the air that is in water?"

The children had to think. "I can use the air in water," said Bob. "I can swim under water."

"But you can't stay under water very long," said Jane. "You have to come up for air."

"Boys and girls can not use the air that is in water," said Miss Adams. "But some animals can use it."

"Fish can use the air in water," said Jimmy. "Fish live in water all the time."

"So do tadpoles," said Nancy.

"Turtles live in water," said Susan.

"But they come up for air," said Bob.

"Yes," said Miss Adams. "Fish and tadpoles can use the air in water but turtles can not. They have to come up for air. All animals need air to live."

"Something else needs air," said Miss Adams. "Would you like to find out what it is?"

"Oh, yes!" the children cried. They always liked to try something new.

"Here is a candle, Susan," said Miss Adams. "Will you light it, please?"

Susan lighted the candle. The candle burned.

"Now, Jane, you may put this glass jar over the candle."

Jane put the jar over the candle. The candle slowly stopped burning.

"Why did the candle stop burning?" asked Jane.

"The glass jar shut out the air," said Miss Adams. "The fire could not burn without air."

"You have done an *experiment*," she said. "What have you found out?"

"Fire needs air to burn," said Bob.

"Let's do it again," said Jimmy.

They did the experiment again. This time when the candle was almost out, Jimmy said, "Pull up the jar, Jane. Give the candle some air."

Jane pulled up the jar. The candle burned as well as ever.

"See. It didn't stop burning. It had some air," said Jimmy.

"If fire doesn't have air, it can't burn," said Bob. "The more air a fire has, the faster it burns. I burned the leaves in our yard last autumn. The wind blew and made the fire burn very fast. Father had to help me put it out."

"How did you do it?" asked Jane.

"We put on water," said Bob.

"Our house caught on fire," said Nancy. "We called the firemen. They came in a hurry. They put water on the fire, too."

"Why does water put out fire?" asked Susan.

"Water keeps out the air. Fire can not burn without air," said Miss Adams.

"Father and I made a fire in the woods one day," said Jimmy. "We could not go away and leave it burning. It might burn the trees. We couldn't find any water and so we used dirt. The dirt kept out the air."

"There are many ways to put out fire," said Miss Adams. "If your clothes catch on fire, you must never run. Lie down and roll up in a rug. Or roll up in a heavy coat. Anything that will keep out the air will put out the fire."

Winter Birds

The children had a feeding shelf for birds. It hung outside the school room window. The children called it a lunch counter. It was a lunch counter for birds.

The children brought food for the birds. They put seeds and nuts and suet on the shelf.

Downy woodpeckers came to the lunch counter. Chickadees and nuthatches came, too. Every day the children watched the birds eat.

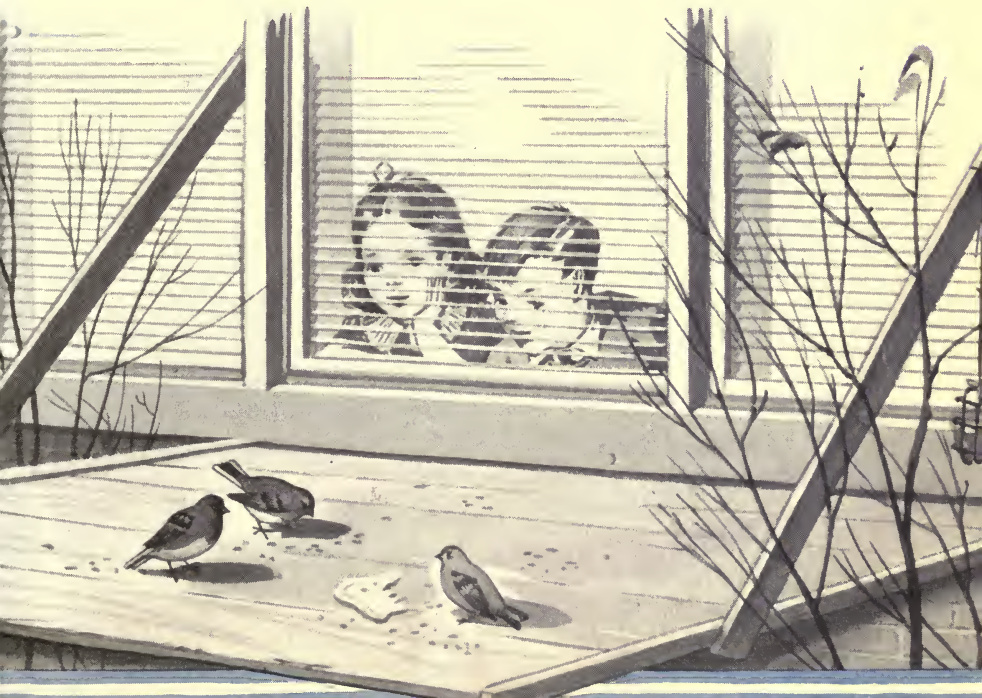
One day some new birds were eating at the lunch counter.

"What is the little bird?" asked Nancy. "It has a short, thick beak. It must be a seed eater."

"That is a goldfinch in its winter dress," said Miss Adams.

Nancy was surprised. "The goldfinch is not so pretty now," she said. "Its feathers are gray. Last autumn it had beautiful yellow feathers."

"The juncoes are eating seeds, too," said Miss Adams. "The juncoes are the gray birds with the white tail feathers and light colored beaks. They are sometimes called snow birds. They are here only in the winter."

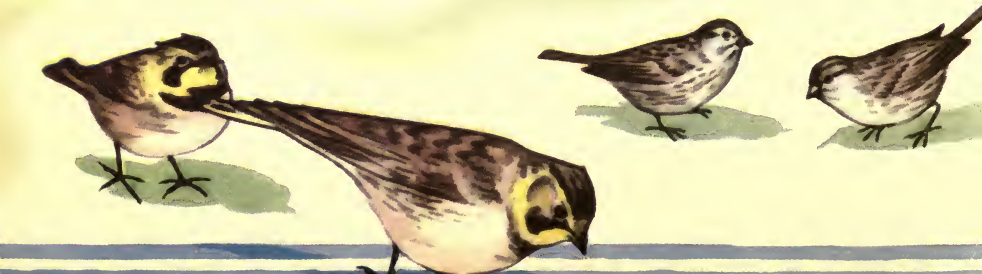


Some seeds fell from the lunch counter. The sparrows came and ate them. One day the children saw some other birds on the ground. They were eating seeds, too. They were larger than sparrows. They were brown and white birds. They had yellow throats.

"They are horned larks," said Miss Adams. "The black feathers on their heads look like horns. That is why they are called horned larks."

"They don't walk like sparrows," said Jimmy. "They walk like chickens."

"The horned lark stays here all winter," said Miss Adams. "It has a pretty song. It sings as it flies."



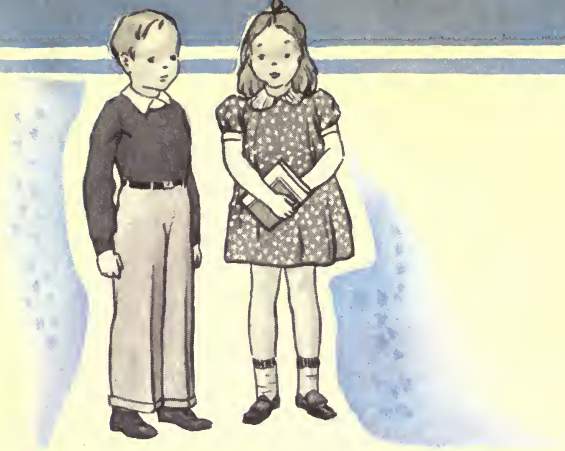
"Look at this red bird!" cried Nancy one morning. "It is the most beautiful bird that ever came to our lunch counter."

"It is a cardinal," said Miss Adams. "Cardinals eat sunflower seeds. They eat apples, too."

"If we put apples and sunflower seeds on the shelf, maybe the cardinal will come every day," said Jane.

Another bird that came to the lunch counter was the blue jay. The blue jay was beautiful, but it did not have very good manners.

"It talks too much," said Bob.



Stand Up!

Jimmy stands up straight and tall,
He does not lean against the wall.

Nancy stands on both her feet,
That is why she looks so sweet.

Stand up straight as you are told,
Or you'll soon be looking old.

Sit Up!

The proper place to put your feet
Is on the floor, not on the seat.

When you're eating, sit up straight!
Do not get too near your plate.

Sit up straight if you are able
Do not lean upon the table.

Finding Rocks Is Fun

Jack and Cowboy Hal live on a ranch. The ranch is in the west, near the mountains.

One day Jack and Cowboy Hal went for a ride. They saw many rocks. Cowboy Hal told Jack some things about rocks.

"Some rocks are harder than others," he said. "Try to break this one, Jack. See what happens."

Jack hit the rock with another rock. He could not break it. But Cowboy Hal could break it.

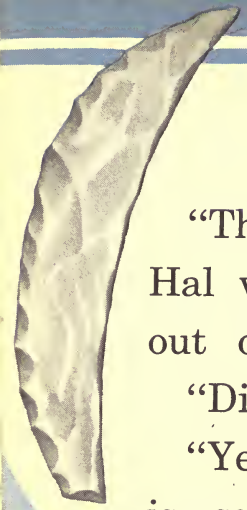
"You see, it is very hard, Jack. Feel how sharp the edges are. The edges are so sharp they will cut things. This rock is quartz."

Cowboy Hal broke another rock. "Feel the edges of this rock," he said.

"They are not sharp," said Jack. "That rock is not quartz."

"No, this is a soft rock," said Cowboy Hal. "Soft rocks break easily. They do not have sharp edges."

"Rocks are used for many things," Cowboy Hal told Jack. "Sometimes they are used to make houses. They are also used to make walls. Rocks make strong houses and walls."



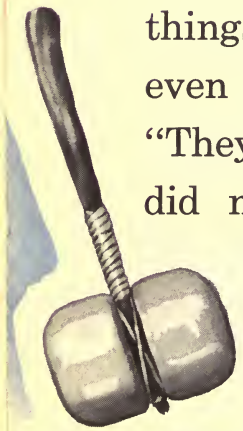
"The Indians used rocks," Cowboy Hal went on. "They made arrowheads out of rocks."

"Did they use quartz?" asked Jack.

"Yes, they used quartz because it is so hard. They could make thin arrowheads of quartz. They could make the arrowheads large or small. They even made knives out of quartz."

"They could cut things with quartz," said Jack. "That is why they used it to make their knives."

"The Indians used rocks for many things. They made hammers. They even made dishes," said Cowboy Hal. "They used many kinds of rocks. They did not always use quartz."



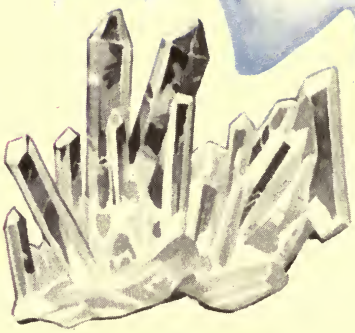
Jack and Cowboy Hal took many kinds of rocks back home.

Jack said, "I'll put all the rocks of one color together."

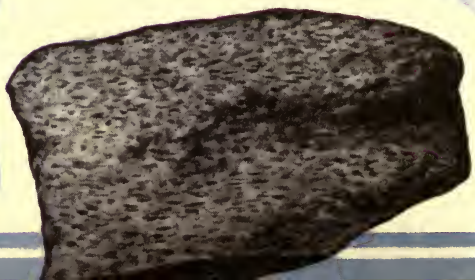
When he had all his rocks together, he said, "I have red rocks and yellow rocks. I have white rocks and rocks with many colors. But the prettiest rock I have looks like glass. It is clear. I can almost see through it."

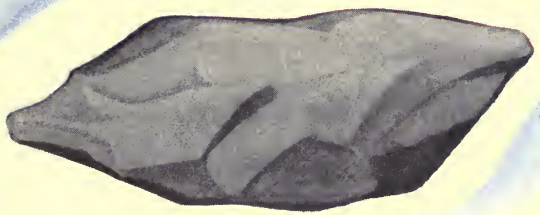
"It is quartz," said Cowboy Hal. "Not all quartz is like this piece. Some quartz is red. Some is yellow. Quartz may be any color. Very few pieces of quartz are clear like glass. But quartz is always very hard."

"I have some hard rocks and some soft rocks," said Jack. "Now I'll put the hard rocks together and the soft rocks together."



These are Jack's hard rocks.





These are Jack's soft rocks.

A Story in the Snow

"Would you like to read a new kind of story?" asked Cowboy Hal one morning. "It is a story in the snow."

Jack laughed. He liked new things.

"Here it is," said Cowboy Hal as he pointed to some tracks in the snow. "Tell me what you see."

"I see rabbit tracks," said Jack. "Maybe the rabbit was looking for food.

"Ho! some more tracks!" He stopped to look at them. They came from the side. "These are dog tracks. A dog must have chased the rabbit!"

"See the tracks! The rabbit was in a hurry. The dog was right after it!"

Jack ran so fast he nearly fell down.

"Oh!" he shouted. "They had a fight! Maybe the dog killed the rabbit! The tracks are all over the snow. Here's some rabbit fur.

"Oh, look! the rabbit must have been hurt. It pulled one of its legs through the snow. There's its hole! It ran into its hole. The dog did not get it."

The Winter Sky

Jack wanted to ride and look at the winter sky. But Cowboy Hal said, "You'll freeze your ears! It is 20 below zero. Let's stay inside and I'll tell you about the sky."

"Tell me about the moon," said Jack.

"The moon is a heavenly body," said Cowboy Hal. "It is much nearer the earth than the sun is. It is much smaller than the sun, too."

"Is there air around the moon?" asked Jack.

"No," said Cowboy Hal. "There is no air around the moon. There is air all around the earth. But if you should go very far above the earth, there would be no air."

"Then there isn't any air where the sun and moon and stars are," said Jack.

"That is right," said Cowboy Hal. "Now let's look out of the window at the moon. There's a new moon tonight."

The new moon was low in the west. It looked like the moon in the picture.

"The moon does not always look like that," said Jack. "Sometimes it is big and round."

"Then it is a full moon," said Cowboy Hal. As he and Jack were talking, the new moon set behind the mountains.

"Tomorrow night the moon will look larger," said Cowboy Hal.

"Each night the moon will look a little larger

and larger

and larger

and larger

and larger

and larger

until it is round.

"Then it will be a full moon."

"Then the moon will begin to look smaller. Each night it will look smaller than it did the night before.

"It will look

smaller

and smaller

and smaller

and smaller

until you can't see it.

"The next time you see it, the moon will be new again."

Jack went to a north window.

"There's the Big Dipper," he said. "I can always find it in the sky."

"Did you know there is a Little Dipper, too?" asked Cowboy Hal. "I'll show you how to find it. Here, I'll draw a picture.

"This is the Big Dipper. These two stars of the Big Dipper always point to the North Star. Here is the North Star."

"The North Star is a part of the Little Dipper. Now, Jack, can you find the Little Dipper in the sky?"

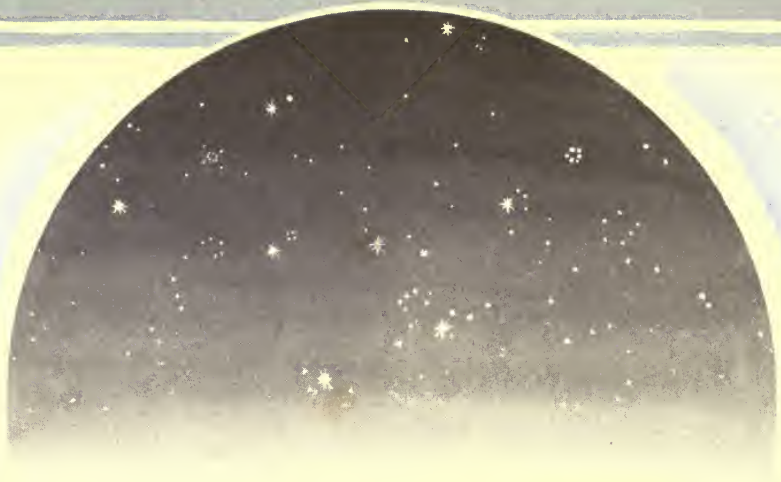
"Oh, yes," said Jack. "I see the Little Dipper."

"I know another good picture in the winter sky," said Cowboy Hal. "We can see it from a south window."

"A long time ago men thought the stars were people in the sky," Cowboy Hal told Jack. "They told stories about the star people. One of the stories was about a man called Orion. They said he wore a belt. The belt was made of three bright stars.

"Look in the south sky, Jack. Do you see three bright stars close together? They make Orion's belt. Now can you see the picture of Orion?"

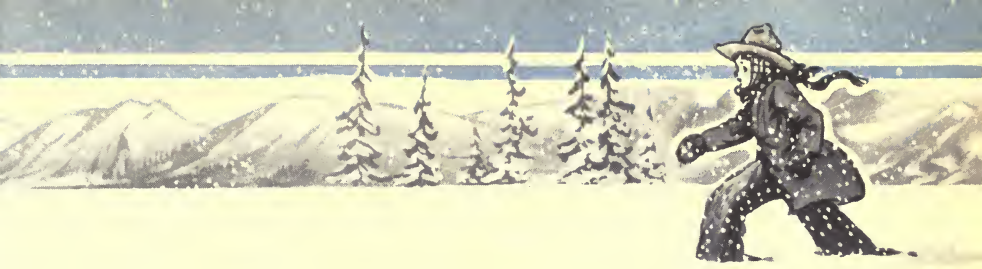
"Yes," said Jack. "I see Orion."



"Are the stars in Orion's belt heavenly bodies?" asked Jack.

"Yes," said Cowboy Hal. "All stars are heavenly bodies. Stars are hot like our sun. But they are so far away we can not feel their heat.

"Stars shine. They are so very, very far away from the earth that they look small. They are like lights that are far away. Look at the light in the house across the field. It looks small because we are so far away from it. The stars look small because we are so far away from them."



Weather in Many Places

Where Jack lives, it is very cold in winter. The thermometer is often below zero. Sometimes it is 40 below zero. Then Jack must be careful when he goes outside. He might freeze his ears!

The place where Pablo lives is not cold in winter. The thermometer is 60 above zero or 70 above or 80 above. Sometimes it is too hot. Then Pablo stays in the house to keep cool.

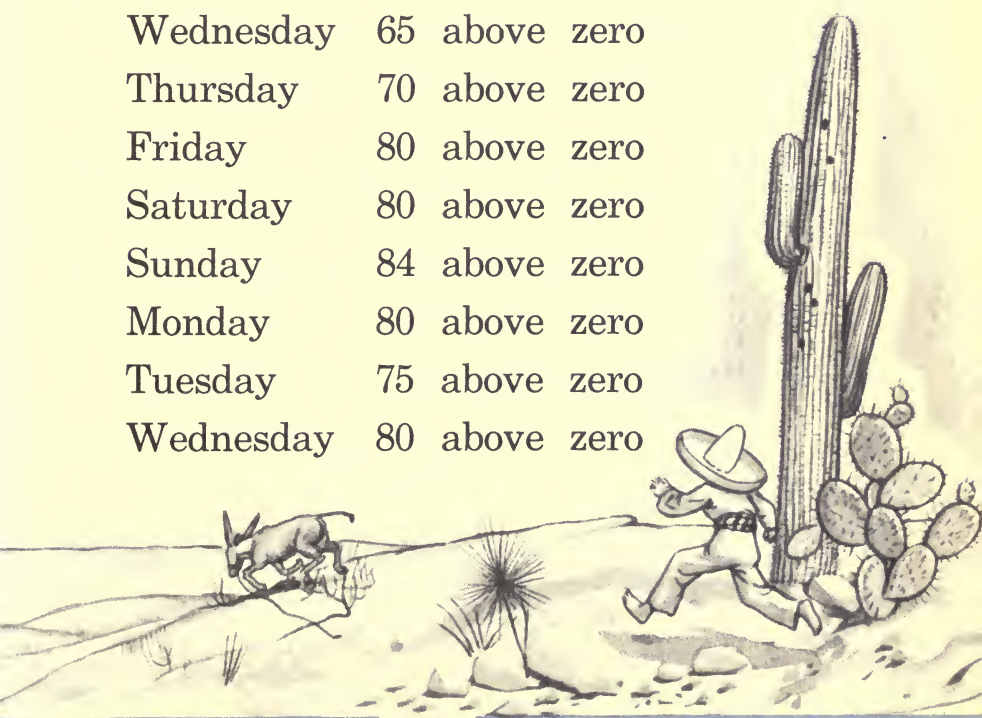
The place where Bob lives is not as cold as where Jack lives. It is not as warm as where Pablo lives. There is snow in the winter. The rivers and lakes freeze. Bob can go skating.

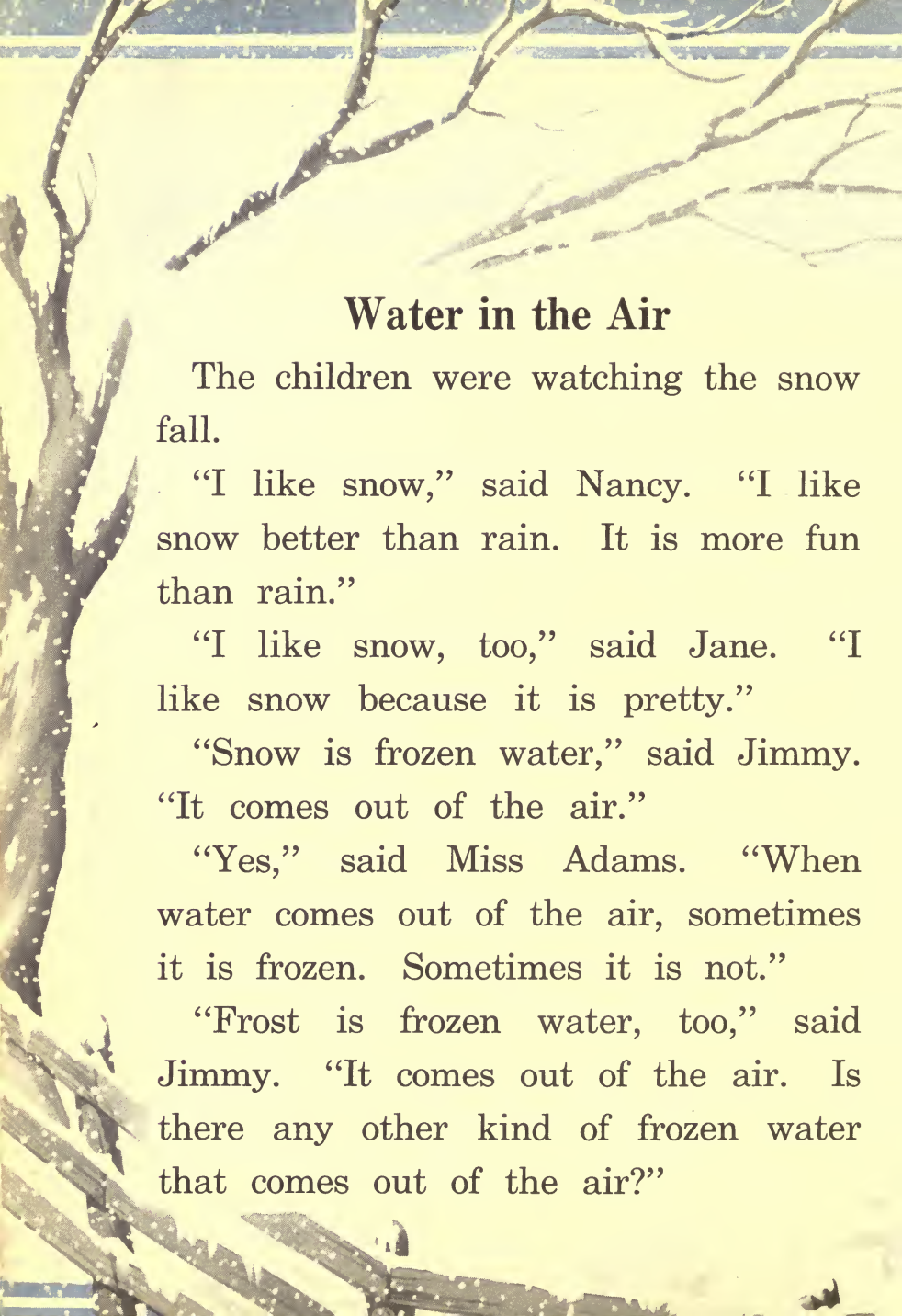
Bob kept a record of the weather in January. He looked at the outside thermometer every day. He wrote the number where the red line was. January was a cold month. The red line of the thermometer was always short. This is his record:

Monday	20 above zero
Tuesday	10 above zero
Wednesday	Zero
Thursday	5 below zero
Friday	10 below zero
Saturday	Zero
Sunday	15 above zero
Monday	20 above zero
Tuesday	5 above zero
Wednesday	Zero again

Pablo kept a record of the weather. He looked at the thermometer every day. He wrote the number where the red line was. January was not a cold month where Pablo lives. The red line of the thermometer was always long. Here is the record Pablo made:

Monday	78	above zero
Tuesday	72	above zero
Wednesday	65	above zero
Thursday	70	above zero
Friday	80	above zero
Saturday	80	above zero
Sunday	84	above zero
Monday	80	above zero
Tuesday	75	above zero
Wednesday	80	above zero





Water in the Air

The children were watching the snow fall.

"I like snow," said Nancy. "I like snow better than rain. It is more fun than rain."

"I like snow, too," said Jane. "I like snow because it is pretty."

"Snow is frozen water," said Jimmy. "It comes out of the air."

"Yes," said Miss Adams. "When water comes out of the air, sometimes it is frozen. Sometimes it is not."

"Frost is frozen water, too," said Jimmy. "It comes out of the air. Is there any other kind of frozen water that comes out of the air?"

"Sleet is frozen water," said Miss Adams. "Sleet comes out of the air. Sleet and snow and frost are all frozen water. They all come out of the air."

"Rain is water that comes out of the air, but rain is not frozen," said Susan.

"That is right," said Miss Adams. "Sometimes water that comes out of the air is not frozen."

"Dew is not frozen," said Bob. "Dew is water that comes out of the air. Fog is not frozen. Fog is water that comes out of the air."

"What makes water come out of the air?" asked Jane.

"Cold makes water come out of the air," said Miss Adams.

"Ho!" laughed Jimmy. "Heat makes water go into the air. Cold makes water come out of the air!"

"Would you like to do an experiment?" asked Miss Adams.

"Oh, yes!" the children shouted. "Let's do an experiment."

"We'll heat some water," said Miss Adams.

The children put some water in a pan. They put it on the stove. When the water was hot, the children knew it was going into the air. They knew that heat makes water go into the air.

But now Miss Adams held a cold pan over the hot water. This was something new. The children watched carefully.

"Oh, look! there is water on the bottom of the pan," said Jimmy.

"Did it come out of the air?" asked Jane.

"Yes, it came out of the air," said Miss Adams. "I will tell you about it."

"The hot water evaporated. We couldn't see it. But the water was in the air," Miss Adams told the children. "This pan is cold. The cold pan made the water come out of the air.

"Cold makes rain come out of the air. Cold makes dew and fog come out of the air. When the air is very cold, the water freezes. Then it comes out of the air as snow or frost or sleet."

Clouds

"We will do another experiment," said Miss Adams. "This time we will use the teakettle."

The water in the teakettle soon boiled.

"Look at the clouds coming out of the teakettle," said Jimmy. "They look like clouds in the sky."

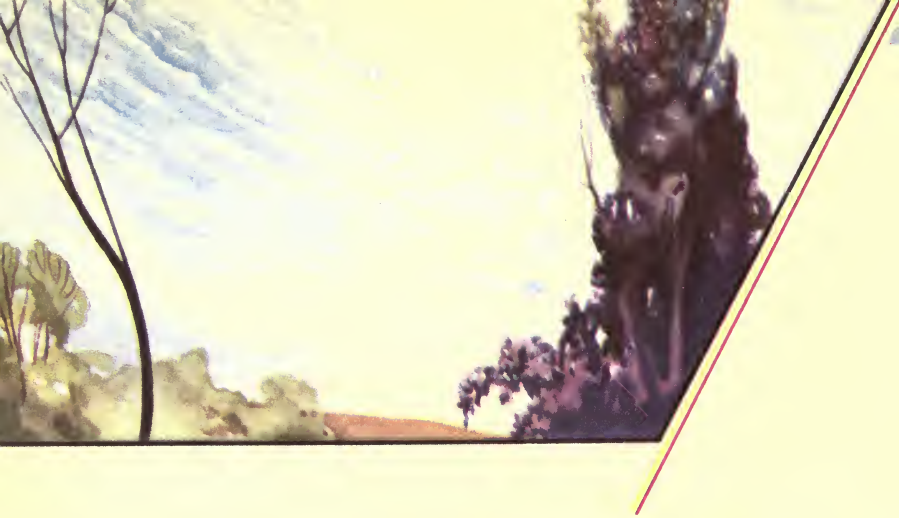
"They are like clouds in the sky," said Miss Adams.

"Are clouds in the sky made of water?" asked Nancy.

"Yes, clouds are made of water," said Miss Adams. "Clouds are made of water that has gone into the air."

"Rain clouds are made of water," laughed Jimmy. "They are full of rain. Rain clouds are dark."

"Some clouds are not dark," said Nancy. "I can see some white clouds. They look soft. They look like balls of cotton in the blue sky. In summer I like to lie on the ground and look at the soft clouds. I wish I could float on one."



"Some clouds are very high," said Miss Adams. "They do not look like these soft clouds. They are like feathers. They are made of tiny crystals of ice."

"Other clouds are low in the sky. We see them near the place the sky meets the earth. They are straight clouds."

The Wind Blows

Miss Adams showed the children how to make paper windmills. Each windmill was fastened to a stick with a pin.

"Now blow," said Miss Adams.

"Ho!" laughed the children. "The windmills move! They turn around!"

"What makes them move?" asked Jane.

"Wind makes them move," Jimmy said. "There is a wind when we blow."

"That is right," said Miss Adams. "You make the air move when you blow. And air that is moving is wind."

The children took their windmills out of doors. A wind was blowing. It made the windmills turn very fast.

"Now we have real windmills," said Jimmy. "This wind is fun." And away he ran with his windmill.

"I like just a little wind," said Bob. "A little wind is good for flying kites."

"Sometimes there isn't any wind at all," said Nancy. "I like that best. I wish the wind would never blow."

"But, Nancy," said Bob. "The wind helps us. The wind does work."

"What work does it do?" asked Nancy.

"The wind blows big windmills," said Bob. "Big windmills work for us."

The Weather Vane

Sometimes there is no wind at all. Then the leaves on the trees are still.

Sometimes there is only a little wind. The leaves on the trees move in the wind.

When there is a strong wind, the branches of the trees move. When the wind is very strong, there is a storm.

Sometimes the wind blows from the north. Then it is a north wind. If the wind blows from the east, it is an east wind. If the wind blows from the south, it is a south wind. If the wind blows from the west, it is a west wind.

"How can you tell which way the wind is blowing?" asked Susan.

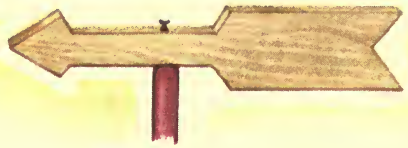
"Weather vanes tell which way the wind is blowing," said Jimmy. "We have a weather vane on our house. It points toward the wind."

"I wish we had a weather vane," said Nancy. "Then we could tell which way the wind is blowing."

Miss Adams told the children how they could make a weather vane.

Next day Bob brought some thin wood to school. He cut the wood with his saw. He made an arrow.

Then the children made a hole in the arrow. They fastened it to a stick. Now it looked like this:



The children took the arrow outside. They put it on a post. The wind blew it. The arrow pointed to the west.

"There is a west wind," said Jimmy. "The wind is blowing from the west."

The Earth

"My Daddy told me that the earth is round like a ball," said Susan. "If it is round, why don't we fall off?"

"The earth pulls things to it," said Miss Adams. "Let's do an experiment. Here is a ball. Throw it into the air. What happens?"

"It comes down," said Jimmy.

"The earth pulled it back. The earth pulls everything to it," said Miss Adams.

"I know another experiment," said Bob. "Here, throw my cap out of the window. What happens?"

The children tried the experiment. The cap fell to the ground.

"The earth pulled it," said Nancy.

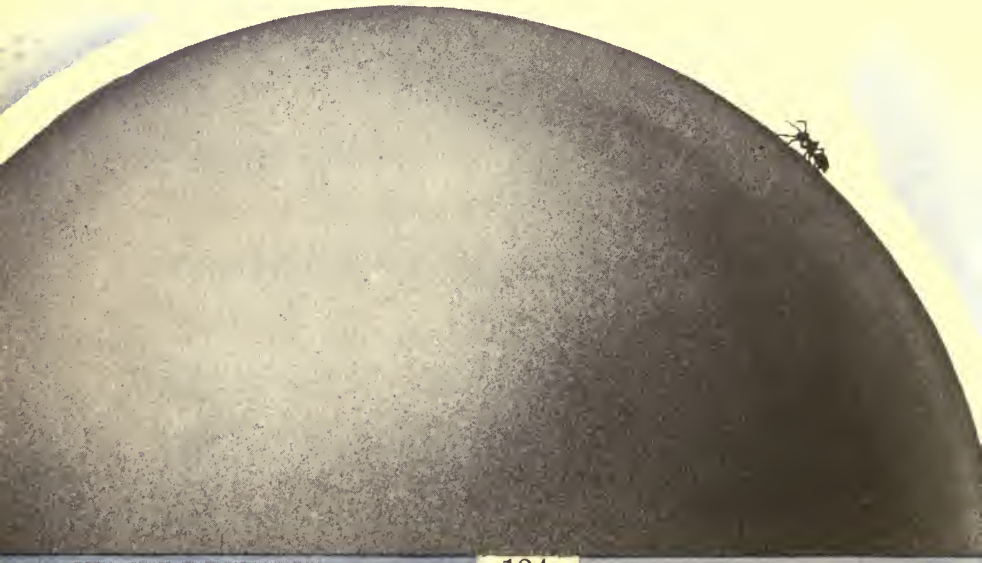
"I know an experiment," said Jane. She jumped up and down. "I jump up. Then the earth pulls me down to it."

"The earth doesn't look round," said Susan. "Why doesn't it?"

"Think of an ant on a great big ball," said Miss Adams. "Do you think it could see very much of the ball?"

"No," said Susan.

"You are like the ant. The ball is many, many times larger than the ant. The earth is many, many times larger than you. The ant can see only a little of the great big ball. You can see only a little of the great big earth."



What Am I?

I come as dew,
I come as rain,
To patter on
Your window pane. What am I?

I have no hands
With which to feel,
But I can pull
And pick up steel. What am I?

I'm in the sky,
My face is bright,
I change the way
I look each night. What am I?

I'm round about you
Everywhere.
I make fire burn.
My name is _____. What am I?

Susan's Bulbs

"Mother gave me some narcissus bulbs," said Susan one morning. "Let's plant them. Let's see how they grow."

The children planted the bulbs in the window box. They planted all the bulbs but one. This one they cut open. They wanted to see what was inside.

"It looks like an onion," said Jane.

"Yes, it does look like an onion," said Miss Adams. "An onion is a bulb, too."

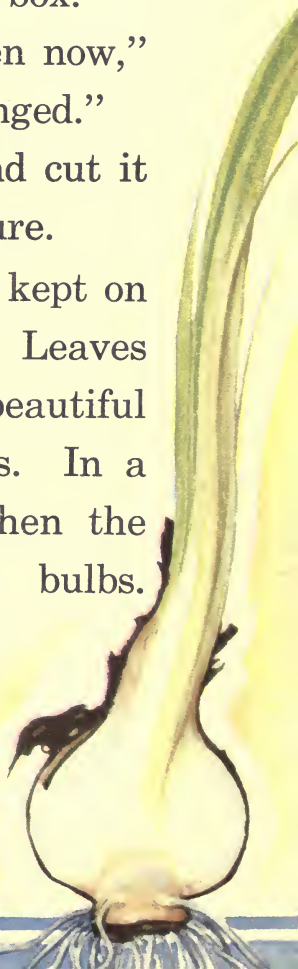
The bulb had a thin brown skin. In the middle was something that looked like a little stem. Around the stem were thick white leaves.

In a few days a little green stem had grown out of each bulb in the box.

"Let's cut one of the bulbs open now," said Susan. "Maybe it has changed."

The children dug up a bulb and cut it in two. It looked like the picture.

The plants in the window box kept on growing. The stems grew long. Leaves grew around the stems. Then beautiful white flowers grew on the stems. In a few days the petals fell off. Then the children dug up one of the bulbs. They cut it open. It was soft.



"The plant got its food from the bulb," said Miss Adams. "Now the bulb is soft. The food is gone."

Susan watched for bulbs to grow in her yard. She wanted to tell her mother how they grew.

One day she found some green leaves coming up.

"Oh, Mother, look!" she cried. "The daffodils are growing."

Then she told her mother what would happen to the bulbs. "There is food in the bulbs. That is why the plants can grow. When the plants are big, the food will be gone. Then the bulbs will be soft."

"Plants need food to grow. They need sunshine, too," said Mother. "This warm spring sunshine will help the daffodils grow. It will help all plants grow."

Spring Is Here!

The sunshine was warm next day, too.

"Let's go to the woods," said Susan to her mother. "Let's have a picnic."

So Susan and her mother went to the woods. They took Jane and Jimmy with them. What a good time they had!

They saw many birds.

"The birds have come back from their winter homes," said Jane. "Maybe they will make their nests in the trees."

"Some of the birds did not go away," said Jimmy. "I see some goldfinches. They have been here all winter."

"They have put on their summer dresses again," said Jane. "They are yellow. Last winter they were gray."

"Where are the juncoes?" asked Jane.

"The juncoes have gone north," said Mother. "They live here only in winter."

The children saw a woodchuck.

Jimmy said, "The woodchuck has come out of its hole. It will not hibernate again until autumn."

They saw ants on the ground. The ants had come out of their winter home.

"B-z-z-z-z!"

"The bees are out of their hives," laughed Susan. "Maybe they are near some flowers. Let's look."

The bees *were* near some flowers. The flowers were small. They were pink.

"They are Spring Beauties," Mother said. "Haven't they a good name? Spring Beauties bloom very early in the spring."

The children found a nice place to eat their lunch. They ate in the sunshine.

A Week of Spring Weather

The children kept a record of spring weather. Every day at ten o'clock they looked at the thermometer. They looked at the clouds. They looked at the weather vane. Then they wrote the record.

Monday, April 2

10:00 The thermometer is at 60.
It is a warm day.
There are rolling clouds in the sky.
The ground is muddy today.
There was dew on the grass today.
The wind is from the east.

Tuesday, April 3

10:00 The thermometer is at 65.
It is warmer today.
There are rolling clouds in the sky.
Some of the clouds are dark.
It may rain.
The wind is from the east.

Wednesday, April 4

10:00 The thermometer is at 50.

It is cool today.

It rained last night.

Today the rain clouds are gone.

The sky is clear. There are no clouds.

The wind is not blowing.

Thursday, April 5

10:00 The thermometer is at 50.

It is cool today.

The clouds are low. They are straight clouds.

The wind is blowing from the north.

Friday, April 6

10:00 The thermometer is at 40.

It is cold today.

The clouds are like feathers.

They are high in the sky.

The wind is blowing hard.

It is blowing from the north.

The Apple Tree in Spring

The warm spring weather made buds on the trees grow. The apple tree in Nancy's yard was full of buds.

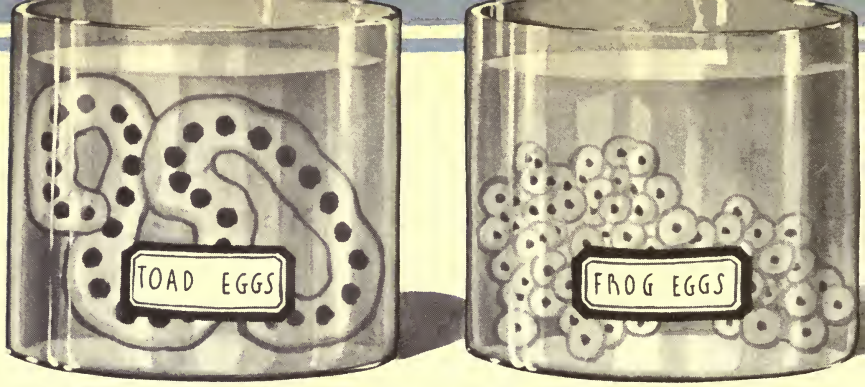
Nancy looked at the buds every day. At first they were very small.

The buds grew bigger. Some of them popped open. Nancy could see some pink on them. The outside scales fell off.

When the buds opened, some of them grew into flowers. Some of them grew into leaves. The flowers had pink and white petals.

"How beautiful they are!" said Nancy.

Soon the petals dropped off. The leaves grew bigger. Little apples grew from the flowers.



Frogs and Toads and Salamanders

"We can have some tadpoles," said Bob one day. "Here are some toad eggs."

"They don't look like toad eggs," said Jimmy. "Are they?"

"These are frog eggs," said Miss Adams. "See, these eggs are in a bunch. Toad eggs are laid in a string. But you will have some tadpoles. Frog eggs hatch into tadpoles, too."

Bob put the eggs into a glass dish. The children covered the eggs with pond water. They put water plants in the water. They did not put the eggs into the aquarium. The sun fish might eat them.

Soon the eggs hatched into tadpoles. At first the tadpoles looked like toad tadpoles. They ate water plants.

The tadpoles grew and grew. They grew much larger than toad tadpoles.

The children watched them every day.

"Why don't they get legs?" asked Bob.

"Frogs take longer to grow than toads," said Miss Adams. "They will not get their legs until summer. But their legs will be very strong."

"Frogs can jump a long way," said Susan.

"Frogs can swim, too," said Jimmy.

"They have smooth skins," said Bob. "I tried to catch one. I couldn't hold it."

"Do salamanders lay eggs like toads and frogs?" asked Jane.

"Yes, salamanders lay their eggs in water," said Miss Adams. "They often lay their eggs in ponds. Their eggs look something like frog eggs. They are laid in a bunch."

"Do salamander eggs hatch into tadpoles?" asked Bob.

"Yes," said Miss Adams. "The eggs of frogs, toads, and salamanders hatch into tadpoles. The salamander tadpoles grow slowly. Their tails grow, too."

"Our salamander had a tail," said Jimmy. "Frogs and toads do not have tails when they grow up."

The Horned Toad

One day the horned toad came out of the sand. It turned its head and looked at the children.

"Let's put it outside," said Nancy. "It can find a mate and lay some eggs."

"But, Nancy, the horned toad isn't really a toad," said Jimmy. "It has scales. Maybe it doesn't lay eggs."

"The horned toad does not lay eggs," said Miss Adams. "Its young are born alive in the summer. Remember, too, that the horned toad lived in a dry place. There are no other horned toads here. Where would it find a mate?"

"If we send it back to Rita and Pablo, it can find a mate," said Bob.

They sent the horned toad to Rita and Pablo. Pablo put it out of doors. It ran away on the sand.

The Crayfish

The children were on a field trip. They were down by the pond.

"Look at the little holes," said Jimmy. "They are all along the edge of the water."

"I wonder what animal dug the holes," said Susan. "It must have been a very small animal."

"Maybe it was a mouse," said Jane.

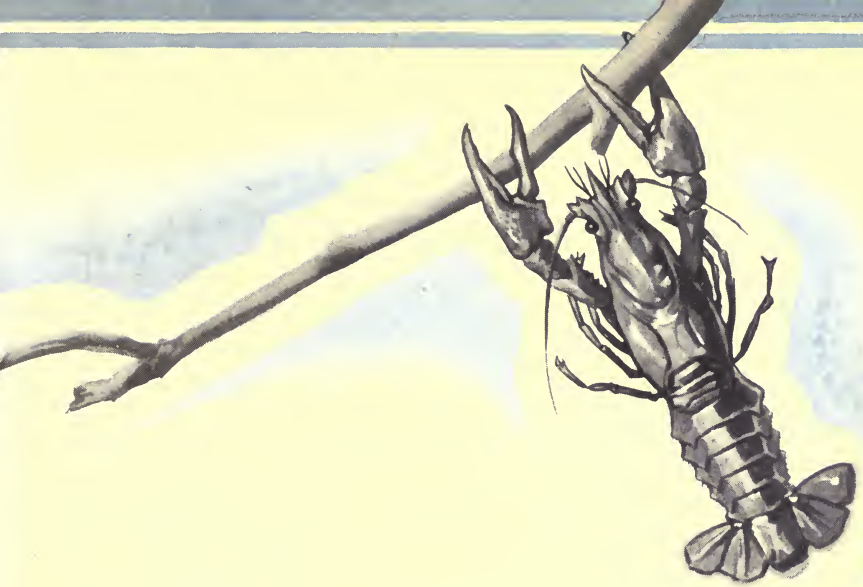
"Oh, no!" said Jimmy. "A mouse would not live near a pond."

"Maybe it was a snake," said Bob.

"A snake couldn't dig a hole," said Jimmy. "Miss Adams, do you know what animal dug these holes?"

"I think a crayfish dug them," said Miss Adams.

"I have never seen a crayfish," said Jane. "Let's find one."



The boys dug into the sand by one of the holes. There was a crayfish!

"Be careful!" said Bob. "Don't let it catch your finger."

Jimmy put a stick near the crayfish. The crayfish took hold of the stick. Jimmy pulled it out of the hole.

"O-o-o-o-oh!" said Jane. "What a funny animal! How many legs it has!"

"It has pincers, too," said Bob. "See, it is hanging from the stick with its pincers."

The children took the crayfish to school. They made an aquarium for it.

"It can swim," said Nancy. "But it backs up when it swims!"

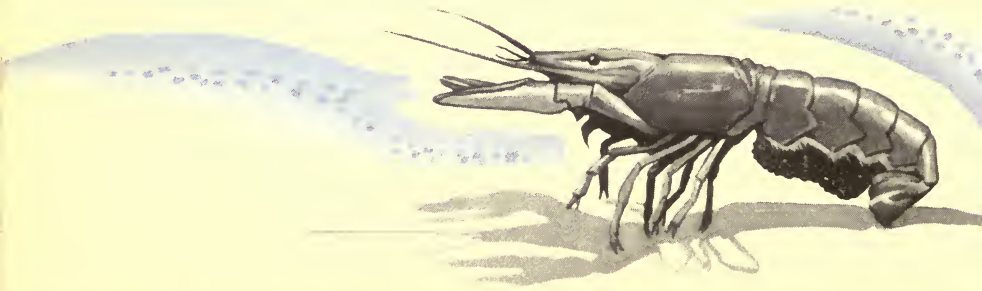
"It has a strong tail," said Bob. "Its tail helps it swim."

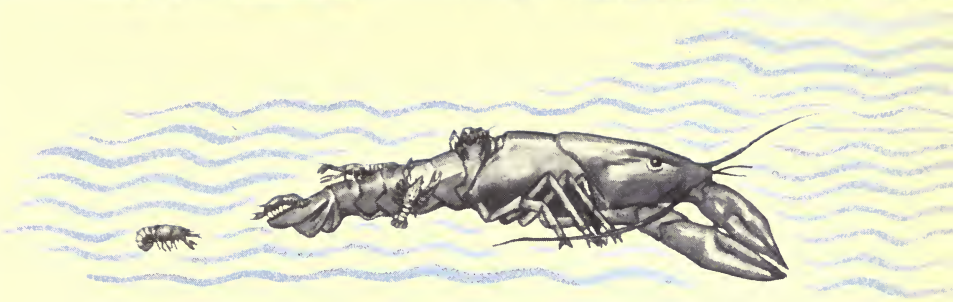
"What are the things under its tail?" asked Susan. "They look like eggs."

"They are eggs," said Miss Adams. "This is a female crayfish. She fastens her eggs under her tail."

"Will the eggs hatch into little crayfish?" asked Jane.

"Yes, and the little crayfish will look like their mother," said Miss Adams.





In a few days the eggs began to hatch. The little crayfish hung on to their mother's tail.

"What will they eat?" asked Susan.

"They will eat the things they find in the water," said Miss Adams. "The mother crayfish does not feed them."

The young crayfish hung on to their mother for several days. One day she hit her tail on the water. Some of the young fell off. Some still hung on.

In a few days all of the young crayfish were swimming in the water.

"There isn't room for them in the aquarium," said Jane. "Let's take them to the pond. Maybe they will dig holes."

Wigglers

The children were on a field trip.

"Oh!" cried Jane. "A mosquito bit me. There is one on you, Nancy. Kill it! Oh, where did they come from?"

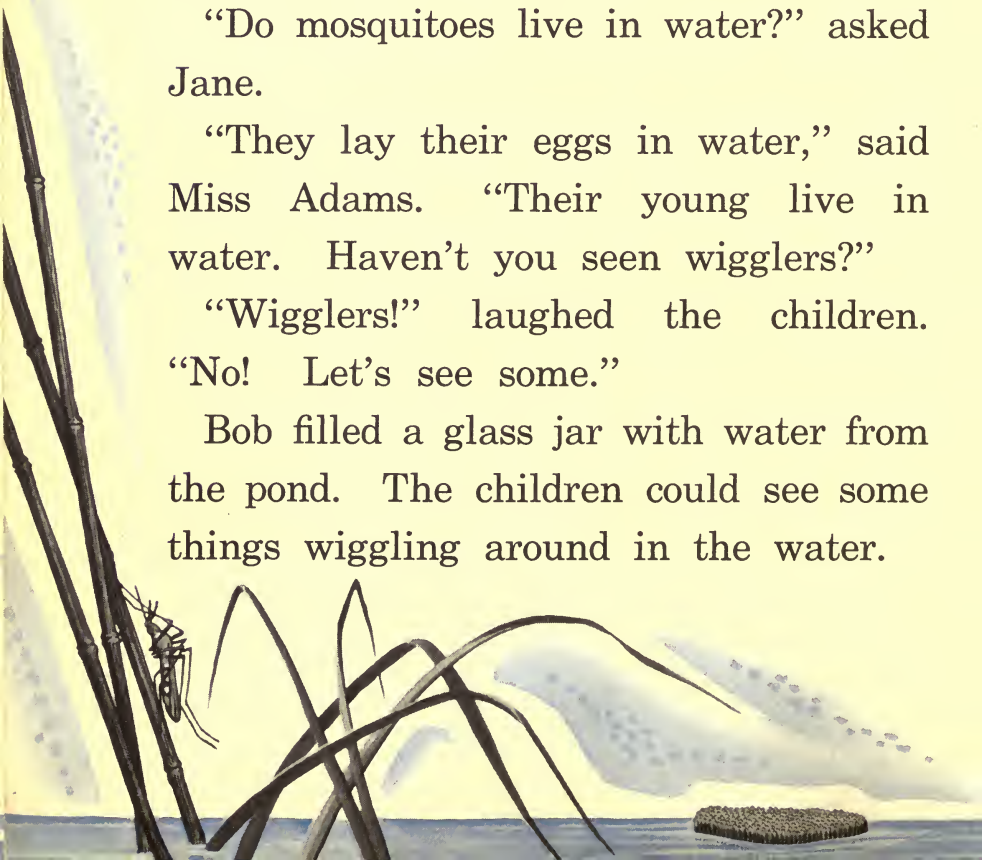
"They came from that little pond over there," said Miss Adams.

"Do mosquitoes live in water?" asked Jane.

"They lay their eggs in water," said Miss Adams. "Their young live in water. Haven't you seen wigglers?"

"Wigglers!" laughed the children. "No! Let's see some."

Bob filled a glass jar with water from the pond. The children could see some things wiggling around in the water.



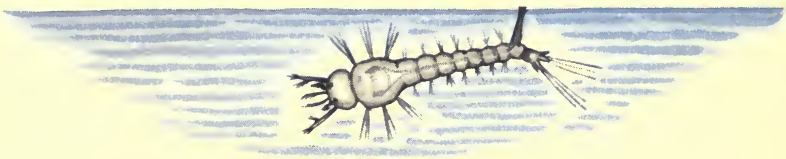
The children took the glass jar to school. They looked at the water through a reading glass.

"There are little animals in the water," said Susan. "They wiggle."

"They swim," said Jimmy. "But they don't swim like fish. They back up!"

"Look!" said Bob. "They come up to the top of the water."

"A wiggler must have air," said Miss Adams. "It comes to the top of the water to get air." Then she drew a picture of a wiggler.



"A wiggler has two parts to its tail. It swims with one. It gets air with the other."

"The wigglers aren't like tadpoles," said Bob. "They have to come to the top of the water for air."

"That is right," said Miss Adams. "And if wigglers can't get air, they die. Would you like to try an experiment?"

"Oh, yes!" the children cried.

"Wigglers grow into mosquitoes," said Miss Adams. "If we can kill wigglers, we will kill mosquitoes."

The children put some wigglers into a glass jar of water. They put some drops of oil on the water. The oil covered the water. The wigglers curled up and died!

"Did the oil kill them?" asked Nancy.

"The oil covered the water," said Jimmy. "The wigglers could not push through the oil. They could not get air, so they died."

"If we put oil on all the ponds, it would kill all the mosquitoes," said Bob.

"The oil would kill other animals, too," said Miss Adams. "We can put oil on water where there are no other animals or plants. But there is another way to kill mosquitoes. This way will not kill other animals. Put some of the wigglers into the aquarium."

Jimmy did this. The sun fish ate every one of the wigglers!

"We can kill mosquitoes by putting fish into ponds," said Miss Adams. "That is a better way than putting oil on the water."

The Insects in Spring

Susan was the one who thought about the insects. One day she said, "I wonder what our insects are doing. Let's look at them."

Something was moving in one of the glass jars. It was the jar that had the goldenrod gall in it.

"It looks like a moth," said Nancy.

"It *is* a moth," said Miss Adams. "The caterpillar slept in the gall all winter. But now the caterpillar has grown into a moth."

"There is a little hole in the gall," said Bob. "Did it come out of the hole?"

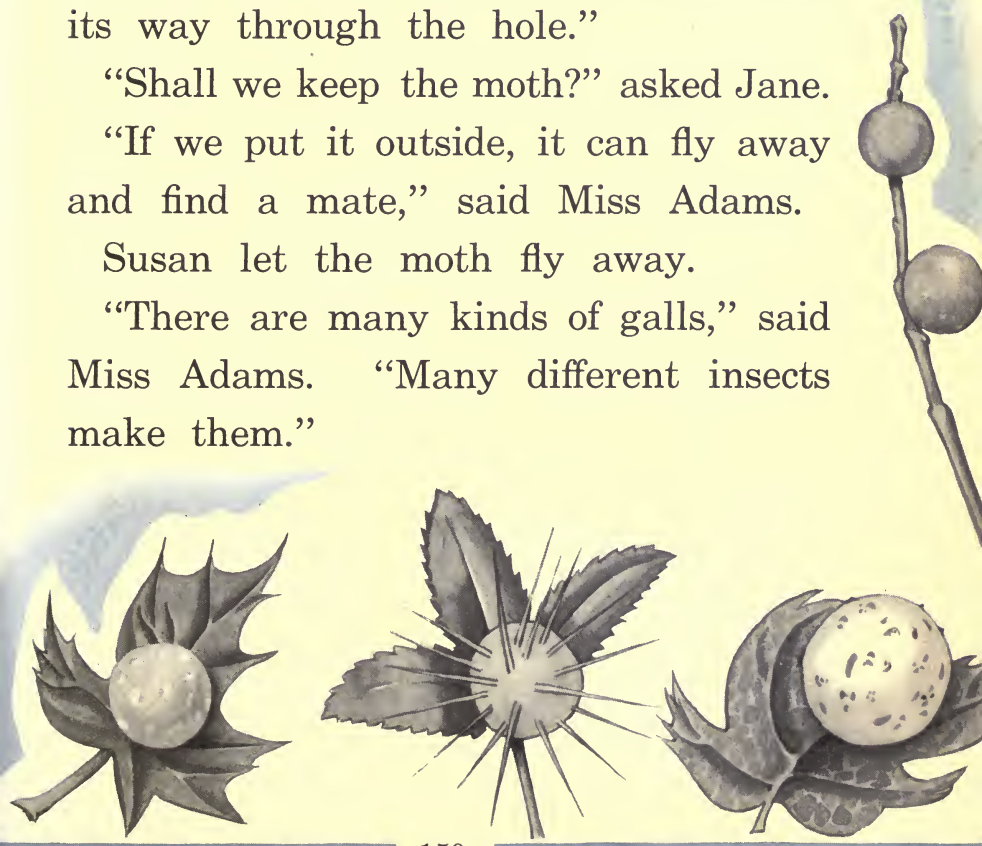
"Yes," said Miss Adams. "Before the caterpillar went to sleep it made the hole. It made the hole very carefully. No other insect could get through it. But the moth could come out. It pushed its way through the hole."

"Shall we keep the moth?" asked Jane.

"If we put it outside, it can fly away and find a mate," said Miss Adams.

Susan let the moth fly away.

"There are many kinds of galls," said Miss Adams. "Many different insects make them."



The Butterfly

Susan looked at the chrysalis the carrot caterpillar had made.

"Last autumn it was brown. Now it is black!" she said.

"Maybe a butterfly will come out of the chrysalis," said Nancy. "I know it will be a butterfly. A butterfly always comes out of a chrysalis. Let's watch and see."

The children watched carefully. It all happened very fast. Before they could say a word the chrysalis broke open. A butterfly flopped out. Its body was big. Its wings were wet. They were folded. They were not pretty.

"That's a funny looking butterfly," said Bob.

"Watch and see what happens to it," said Miss Adams.

The butterfly unfolded its wings slowly. The wings grew larger and larger. The body grew smaller.

"Now it looks like a butterfly," said Bob.

"Oh!" said Susan. "This butterfly has black wings. They look like velvet."

"They have yellow and blue spots!" said Jane. "What a beautiful butterfly!"

"What is its name?" asked Jimmy.

"It is a swallowtail butterfly," said Miss Adams. "It belongs to a family of butterflies. The family name is swallowtail. Swallowtail butterflies have tails on their wings."

"I see the tails," said Jane. "There is one on each wing. They are black."

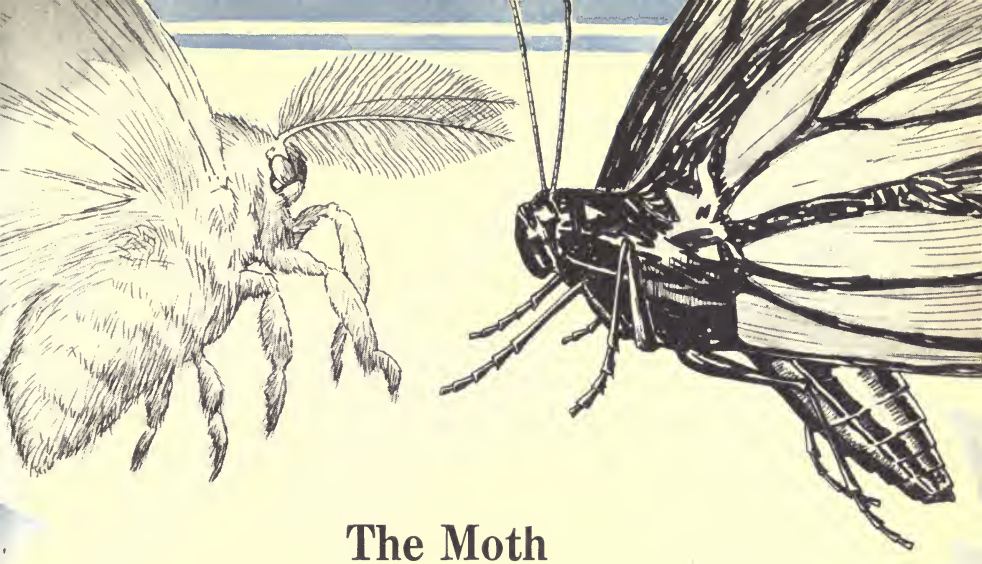
"This is a black swallowtail," said Miss Adams. "It is one of our most beautiful butterflies."

"Let's put it outside so it can find a mate," said Jimmy.

"If it is a female, it will lay eggs," said Miss Adams. "Then it will die."

"Will the eggs hatch into carrot caterpillars?" asked Nancy.

"Of course," said Jimmy. "They will be carrot caterpillars like the one we found. They will eat carrot leaves."



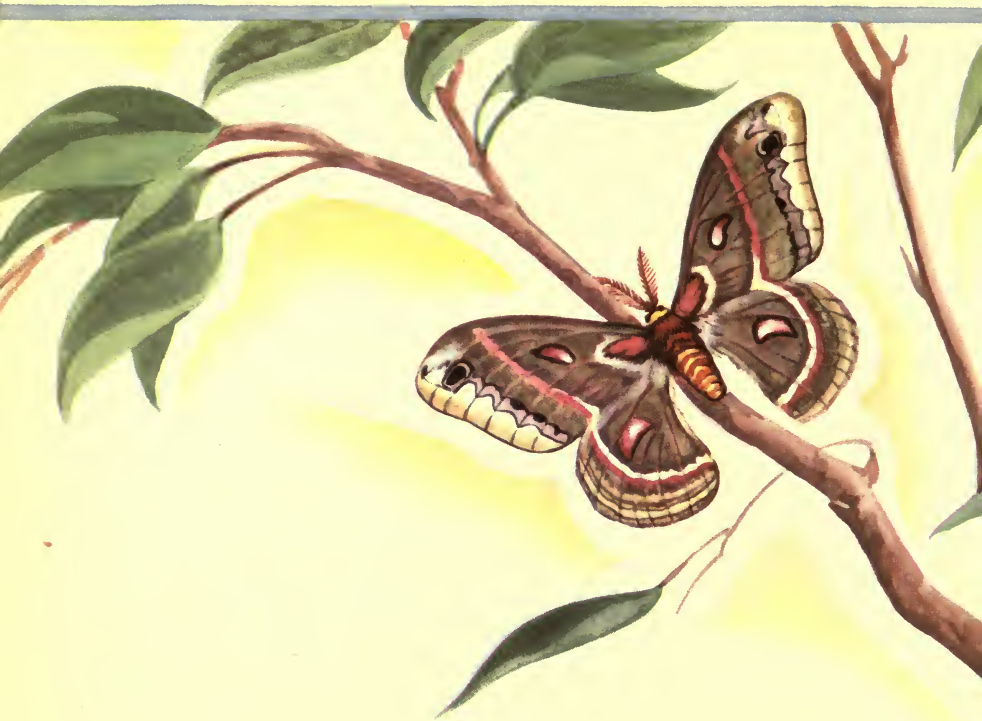
The Moth

"Come, children!" said Miss Adams. "Something is happening to our cocoon."

An insect had pushed its way out of the cocoon. It hung from the cocoon.

"It's a moth," said Jimmy. "A moth comes out of a cocoon. A butterfly comes out of a chrysalis."

"You can tell a moth by its body," said Bob. "Moths have fuzzy bodies. They are fat, too. See, this moth has a fat body. Butterflies have thin bodies. The swallowtail had a thin body."



The children watched the moth.

"What a pretty color!" said Jane. "It has red on it!"

Its wings grew larger. They were very beautiful. They had spots on them.

"It's the largest moth I ever saw," said Bob.

"What is its name?" asked Jane.

"This is called a *Cecropia* moth," said Miss Adams.

The children liked to say Cecropia.

"What are the things on its head?" asked Susan. "They look like feathers."

"They are feelers," Miss Adams told her. "This moth is a female. I know because it has small feelers. The feelers on a male moth are larger."

"I wish we could keep the Cecropia." said Jane. "It's so beautiful. I like to look at it."

"You may keep it," said Miss Adams. "We will put it in a cage. We will set the cage in the open window tonight. Other moths may come to the window."

The children put the cage in the window. The Cecropia moth could not fly away.

How excited the children were next morning. There was another Cecropia on the outside of the cage!

"This must be a male moth," said Jimmy. "It has larger feelers than the female moth."

"The male moth has found our moth," said Miss Adams. "We will put the male inside the cage."

Jimmy put the male moth in the cage.

"We will leave them together," said Miss Adams. "Maybe they will mate."

The children could hardly wait until the next morning. They looked in the cage again.

"Oh, look!" cried Jane. "Our female moth has laid some eggs. They are light brown and black."

"Will they hatch into caterpillars?" asked Nancy.

"Yes," said Miss Adams. "We will keep them and watch them hatch."

Tiny black caterpillars hatched from the eggs. The caterpillars were fuzzy.

"They are baby Cecropias," said Nancy. "What shall we feed them?"

"They will eat apple leaves," said Miss Adams.

The children brought apple leaves for the baby Cecropias. What a lot of leaves those fuzzy black caterpillars ate!

In four days Jane said, "Look! The caterpillars have turned orange!"

"They grew too big for their skins," said Miss Adams. "They shed their skins."

In six days the caterpillars shed their skins again. Then they were yellow.

Again they shed their skins. This time they wore green skins.

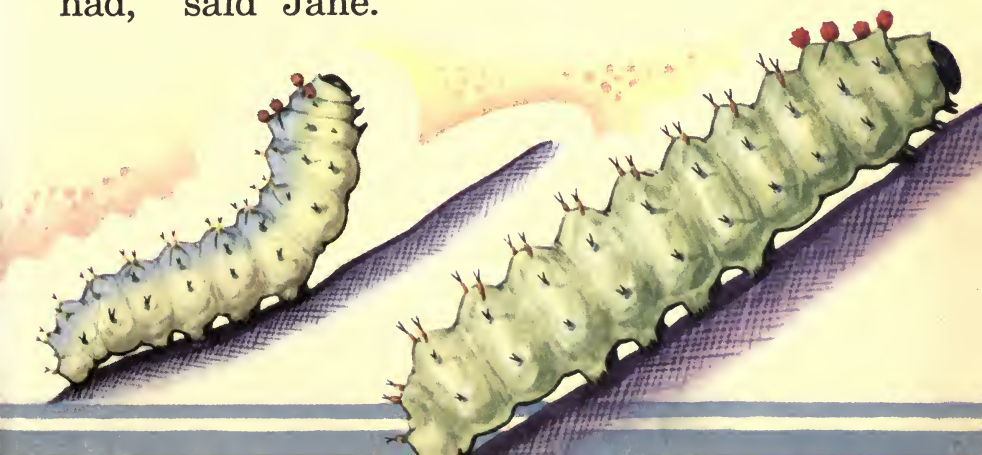
The last time they shed their skins, they were green with red and blue spots.

"Look!" laughed Nancy. "They have red and blue buttons on them."

"They look just like the big green caterpillar we found last autumn," said Bob.

"Yes, the big green caterpillar was their mother," said Miss Adams.

"My! what a lot of children she had," said Jane.



Little Spiders

Susan brought out the box that Eight Legs had been in. In the box were many little spiders!

"Where did they come from?" asked Nancy.

"They hatched from eggs," said Susan. "Don't you remember that Eight Legs laid some eggs?"

"Did the eggs hatch into caterpillars first?" asked Nancy.

"No, spiders hatched from the eggs," said Miss Adams. "Spider eggs do not hatch into caterpillars. Little spiders come out of the eggs."

"Look! the little spiders have been spinning webs," said Jane.

"Spiders catch flies in their webs," said Jimmy. "Eight Legs caught flies in her web. She used them for food."

"I've seen spider webs on the grass," said Susan. "I saw dew on a spider web. It made the web sparkle."

"What shall we do with all our spiders?" asked Nancy.

"Let's put them out of doors," said Bob. "They can find something more to eat. Then they can grow."

The children put their spiders out of doors. The spiders ran away.

Can You Find It?

1. Find the animal that comes from a cocoon.
2. Find the animal that lives in dry places.
3. Find the animal that comes from a chrysalis.
4. Find an animal that has scales.
5. Find the animal that carries its eggs under its tail.
6. Find the animal that makes a nest.
7. Find the animal that spins a web.
8. Find the animal whose eggs hatch into wigglers.
9. Find the animal that spins a cocoon.
10. Find the animal that grows into a frog.

How Do Seeds Grow?

Bob was helping his father in the garden. "How do seeds grow?" he asked.

"Why don't you do an experiment to find out?" asked Father.

Father told Bob what to do. Bob put some bean seeds on wet sand. He kept them warm. He watched them carefully. Then he told the children in school about them.

"I put some beans on wet sand. I kept them warm. The beans got bigger. Water went into the beans. It made little plants inside the beans grow.

"The plants grew so big they broke the beans open. The outside coats of the beans fell open. The plants came out. Little roots grew on each plant. A stem grew, too. Then leaves grew on each stem. The thick, white part of the bean turned green. Then it fell off."

"Why did it fall off?" asked Jimmy.

Bob told him. "Father says the bean has food in it. The food is for the little plant. The little plant used the food in the bean until it had roots. The bean had to have water before the little plant could grow."

"I'm going to plant some seeds," said Jimmy. "I want to watch them grow." So he planted some bean seeds at school.

Two little plants were soon growing.

"Shall we do an experiment with Jimmy's plants?" asked Miss Adams.

"Oh, yes!" shouted the children.

"We will keep both plants in the sunshine," said Miss Adams. "We will water one of them every day. We will not water the other one. We will see which plant grows better."

This plant had water.

This plant did not have water.

The children did another experiment. They planted seeds in two pots. They put both pots in the sunshine. They gave the seeds water every day.

When the plants had grown above the dirt, they put one pot in the dark. They gave it water every day.

They left the other pot in the bright sunshine. They gave it water every day.

They let the plants grow for a week.

Here are pictures of the plants.

Which plant was in the dark?

Which plant was in the sunshine?

The Sun Helps Us

"I'm hot!" said Jimmy when he came in from play. "The sun is hot!"

"I'm hot, too," said Jane. "Look! I have a sun burn!"

"Sunshine is good for you," said Miss Adams. "But you should not let it burn you. Sunshine helps you grow. It helps all animals grow."

"The sun makes the days longer," said Nancy. "We can play longer after school."

"The sun makes the days warmer," said Bob. "We do not need coats."

"The sun helps plants grow," said Jane. "It helped our bean plants grow."

"Our plants in the window have sunshine," said Susan. "Look! the leaves are growing toward the sun."

"Let's turn the plants around," said Nancy. "Let's see what happens."

"The leaves are turned toward us now," said Susan.

How fresh looking the leaves were! They were a pretty green.

The next day the children looked at the plants.

"They are growing toward the sun again," said Susan.

"Plants grow toward the sun," said Nancy. "We will turn the plants often. Then they will grow straight."

Some New Seeds

"I have some seeds," said Bob.

"They do not look like bean seeds," said Susan. "What kind are they?"

"I don't know," said Bob. "Let's plant them and find out."

Each child had a pot of dirt. Each child planted a seed in his pot.

"Now we'll put our pots of seeds in the sunshine," said Jane. "We'll give them water. We'll watch them grow."

One day little plants popped out of the dirt. Two leaves came first.

"The beans had two leaves," said Bob. "Maybe these are bean plants."

But in a few days the children could see that the leaves were round. They were not at all like bean leaves.

The plants grew and grew.

One day Jane cried, "Look! My plant has a bud. It's under the leaves."

Next day she said, "The bud has grown up! It's on a long stem!"

The next day a flower was on Jane's plant. It was red. It was pretty.

"It's a nasturtium flower," said Bob. "Now I know what kind of seeds I had."

"Some seeds grow into things to eat. Some seeds do not," said Jimmy. "Bob's seeds grew into nasturtiums."

Wild Flowers

"Are nasturtiums wild flowers?" asked Susan.

"No," Miss Adams told her. "Wild flowers are flowers that no one plants. Nasturtiums are garden flowers. We plant them. We pick nasturtiums. We should not pick many wild flowers."

"Why?" asked Jimmy.

"Flowers make seeds. If we pick all the flowers, there will be no seeds to make new plants. Soon there would be no wild flowers," said Miss Adams.

"Mother lets me pick violets," said Jane.

"Yes," said Miss Adams. "Violet roots live all winter. Many flowers grow from one root. We may pick some violets."

"I know a place where some violets are growing," said Jane.

Jane took the children to the woods. On the way Miss Adams told them how to pick flowers.

"You should pick flowers by their stems," she said. "You should not pull flowers up by their roots."

Jane found the place where many violets were growing.

The children picked some violets. They were careful to pick the flowers by the stems. They did not pull the flowers up by the roots.

Jack has wild flowers, too. There are many kinds of wild flowers that bloom in the mountains. They are not the same as those found in other places.

This is one kind of wild flower that blooms in the mountains.

This is another kind of wild flower that blooms in the mountains.

Jack is careful to pick wild flowers by the stems. He leaves some flowers to grow into seeds.

Rita and Pablo have many wild flowers. Most of them bloom in the winter. They are not like the wild flowers that Jack sees in the mountains.

The flower that Rita and Pablo like best is the cactus. But they do not pick the cactus flowers. They only look at the flowers.

Cactus leaves are pointed and sharp. The stems of the cactus are thick. The stems hold water for the plant. Sometimes the cactus does not have water for a long time. But it lives. It uses the water that is saved in the stem.

Peter and Pan

"Whoo-o-o-o!" the wind blew all night long.

In the morning Susan looked out of the window. "Oh, Mother, look!" she said. "The wind blew some branches off the trees." She stopped. "Mother! I hear something. I hear something crying!"

Susan and Mother went outside. The cry came from a tree. It came from a tree that the wind had broken.

"The whole top is broken off," said Susan. "I see something! It's right up there. See!"

"Oh, yes," said Mother. "It's a baby squirrel. Poor little thing! It must be cold and hungry."

Susan tried to get the squirrel to come out of the tree. But it was afraid. It would not move.

"Father will get the squirrel for us," said Susan. But the squirrel would not come down to Father.

"I will need a long ladder," said Father. "I will call the firemen. They have long ladders."

The firemen came. They put a long ladder against the tree. One fireman climbed up and got the squirrel.

"Here's another!" he called. He reached into the tree and pulled out another soft ball of fur. He brought them down to Susan.

"Oh, the dear little squirrels!" cried Susan. "Thank you for getting them!"

"Maybe the mother was killed in the storm last night," said Father. "See how cold and wet the babies are."

Susan and Mother took the little squirrels into the house.

"We must get them warm and dry," said Susan. "Let's make a nest."

Mother found a box. She put some pieces of warm cloth in it. Susan put the squirrels into the box. They curled up in little round balls. They put their paws in front of their noses. They put their tails around their heads.

"I'm going to call them Peter and Pan," said Susan. She put the box in a warm place. She put some cloth over the box.

"The squirrels must be hungry," said Mother. "We will feed them."

She warmed some water. She put some milk in it. Susan held Peter while Mother fed him with a dropper. Then Susan fed Pan. He sneezed and sputtered!

Peter and Pan were always hungry. Susan fed them often. After they ate, they curled up with their paws in front of their noses and went to sleep.

They grew fat. Their fur grew thick and soft. Their tails grew bushy. They chased each other about the house. Sometimes they would sleep in the sunshine. At night they curled up in their box close to each other.

"Oh! they have teeth!" said Susan one day. "They bite the end of the dropper."

"They need something more to eat," said Mother. "Milk is not enough."

Susan gave them pieces of apple. She gave them crackers, too. When their teeth were larger she gave them nuts.

"Squirrels need hard food to gnaw," Father told her. "Hard food is good for their teeth."

By the end of the summer Peter and Pan were too large to stay in the house. Susan took them out of doors. They ran and played in the yard. They found a tree and climbed into the branches. But when night came, they were at the door waiting to come in. That night they slept in their box. But a few nights later they slept in the tree.

After that they lived in the yard and came when Susan called them.

Jimmy's Duck

Jimmy got a baby duck for Easter. He took it to school.

Susan got a baby chicken for Easter. She took it to school, too.

"How soft they are!" said Jane.

"How yellow they are!" said Nancy. "I like baby ducks and chickens."

"The feathers on little ducks and chickens are called *down* feathers," said Miss Adams. "Down feathers are much softer than the feathers big chickens and ducks have."

The duck walked around the room.

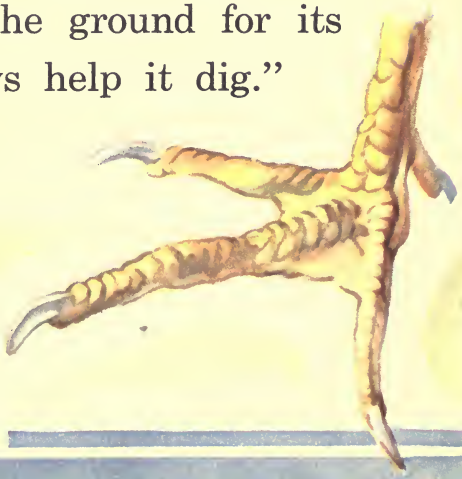
"It looks funny," laughed Susan. "Its legs and feet are far apart."

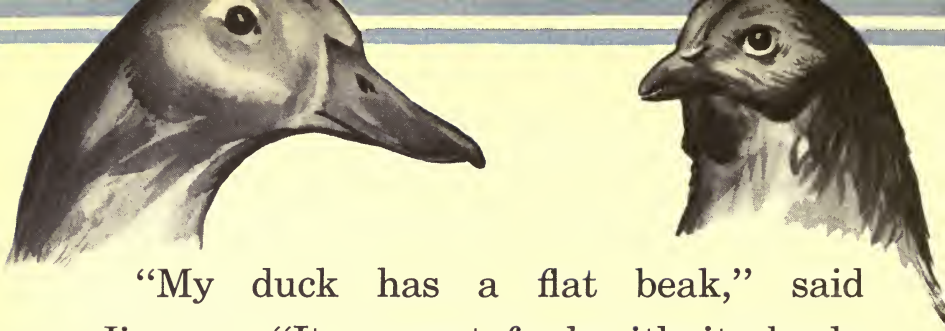
"Ducks are water birds," said Jimmy. "Their feet help them swim. You laugh at the way my duck walks. I'll laugh at the way your chicken swims!"

"But my chicken can't swim," said Susan. "Chickens never swim."

"They haven't the right kind of feet," said Jimmy. "Look at my duck's feet. My duck has webs between its toes. The webs help it swim."

"My chicken has sharp claws," said Susan. "It digs in the ground for its food. The sharp claws help it dig."





"My duck has a flat beak," said Jimmy. "It can get food with its beak. It fills its beak with water. Then it lets the water run out. It eats what is left. Sometimes it fills its beak with mud. It eats insects and plants. It will eat bread. It needs a flat beak to pick up things out of the water."

"My chicken has a hard beak," said Susan. "Feel how sharp it is. It picks up seeds and insects off the ground."

"My duck came out of an egg," said Jimmy. "The egg was bigger than a chicken egg."

"My chicken came out of an egg, too," said Susan. "It could walk as soon as it hatched. Chickens and ducks can walk as soon as they hatch."

"Robins come out of eggs," said Bob. "But baby robins can not walk. They stay in the nest. The mother and father robins bring them food."

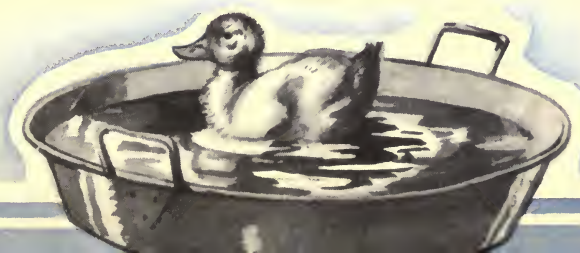
Duck Egg Chicken Egg Robin Egg

"My duck could do something else as soon as it hatched," said Jimmy. "It could swim."

"Let's see it swim," said Jane.

Jimmy put his duck into a pan of water. Away it went! It *could* swim! It looked as if it liked to swim.

"Ducks are water birds," said Jimmy. "Chickens are land birds."



"I know where there are many ducks," said Bob. "They are on a farm. Let's go out and see them."

There was a pond on the farm. When the children came to the pond they tried to count the ducks. But there were so many they could not count them.

They watched a big duck on the shore. They laughed when it started to walk.

"It walks just like Jimmy's little duck," said Susan. "But it doesn't look like Jimmy's duck. It is white."

"My duck will have white feathers when it is older," said Jimmy.

"Do you see the webs on the duck's feet?" asked Miss Adams. "The webs help it walk in the mud. The webs keep it from going deep into the mud."

One mother duck had many little ones.

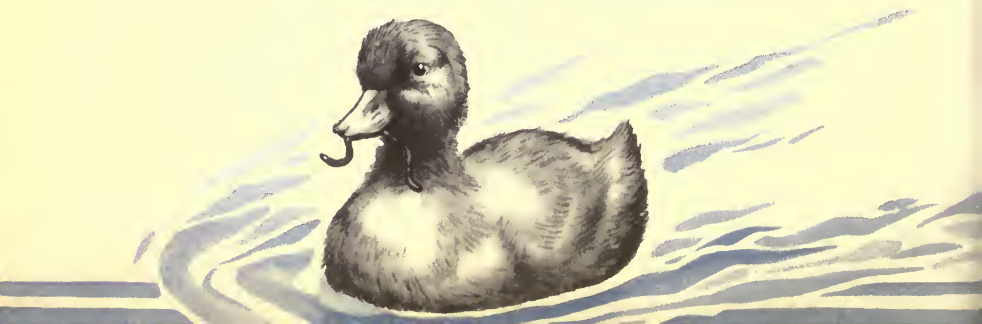
"What a big family!" said Jane.

Jimmy found an earthworm. He threw it into the pond. One little duck got the earthworm. It held the worm in its flat beak and swam away.

All the other little ducks followed. The duck with the worm swam fast but it could not get away from the others. Up they came! They tried to get the worm. They pulled at the worm. They picked at the little duck. They got water all over their heads. But all the time the little duck held on to the worm!

"Hang on! Don't let go!" shouted the children from the shore.

Their shouts must have helped. The little duck swam away with the worm!



The Earthworm

"I'm going to dig some more worms," said Jimmy. "I keep earthworms in a can. I use them when I go fishing."

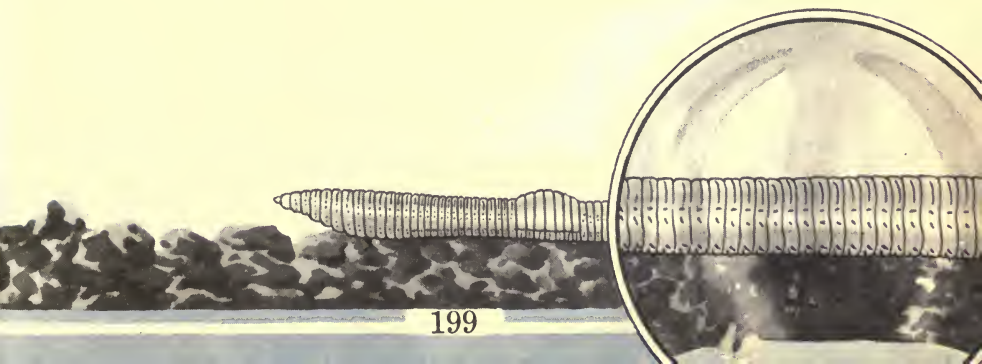
The ground by the pond was soft. Jimmy found many earthworms.

"Let's see one," said Jane. "I want to see its legs."

"Earthworms haven't any legs!" said Bob. "Earthworms crawl!"

"If they haven't any legs, how can they crawl?" asked Jane.

The boys could not tell her. They asked Miss Adams.



"The earthworm has little bristles on its under side," said Miss Adams. "The bristles help it crawl. They are so small you cannot see them without a reading glass. But you can feel the bristles if you pull an earthworm over your finger."

"Earthworms live in the ground," Miss Adams told the children. "They dig holes in the ground."

"I've seen earthworm holes," said Bob. "They look like tiny ant holes."

"The holes let water and air into the ground," said Miss Adams. "They help make the dirt better. Earthworms are not pretty. Most people do not like earthworms. But they help make the dirt better for plants."

In school the children looked at an earthworm through a reading glass. They could see the bristles.

The Oriole Nest

A gay song came from the top of a tree. On a high branch sat a beautiful bird. It had a bright orange breast. It had black and white wings. It was a male oriole.

Soon another bird flew to the tree. It had a light yellow breast. It had gray wings and a gray beak. It was not so bright and beautiful as the other bird. It was a female oriole.

The birds flew away. Soon they came back. The female had some string. She fastened the string to a branch of the tree. She made a swing.

The male sat on the branch and watched her. Sometimes he sang. But he did not help her make the nest.

The female flew away. Back she came with some more string. It was milkweed string. She got it from the stems of milkweed plants.

She kept on doing this until she had many strings hanging from the branch.

Then she began to put string into the nest. She pushed the string into the nest with her beak. Then she pulled it through to the other side. She pushed. She pulled. She used her beak. She used her claws. She worked hard all day. And it took almost two weeks for her to make the nest.

All the time her mate sat beside her. Now and then he flew away with her. He watched her carefully. He called out if anything came near. Sometimes he sang. But the female did all the work.

The nest looked like a basket when it was made. It could swing when the wind blew. The female oriole made the bottom of the nest thick. The middle of the nest was thin. Air could get into the nest. She put soft things in the bottom.

One day she was sitting on the nest. Only her tail and head showed. Under her were six little white eggs. They had tiny black and brown lines on them.

Her mate sat on a branch and sang.

In two weeks there were little birds in the nest. Now the male oriole did not sing so much. He was busy helping the mother bird feed the baby birds.

The baby birds ate caterpillars. And what a lot of caterpillars they ate! They were hungry all the time. They never seemed to get enough to eat.

First the mother bird would fly away for a caterpillar. Then the father bird would go. They were busy all the time.

In two weeks the babies flew down from the nest. They had feathers on their backs. They had short tails. They were almost grown now. They followed the mother bird. She found caterpillars for them. It was several days before the little birds could fly.

Pets on the Ranch

On the ranch where Jack lives there are animals of many kinds.

One day Cowboy Hal had something in his arms. "Here is a pet for you, Jack," he said. "It's a baby lamb. It was born last night. Its mother died. Now we must feed it."

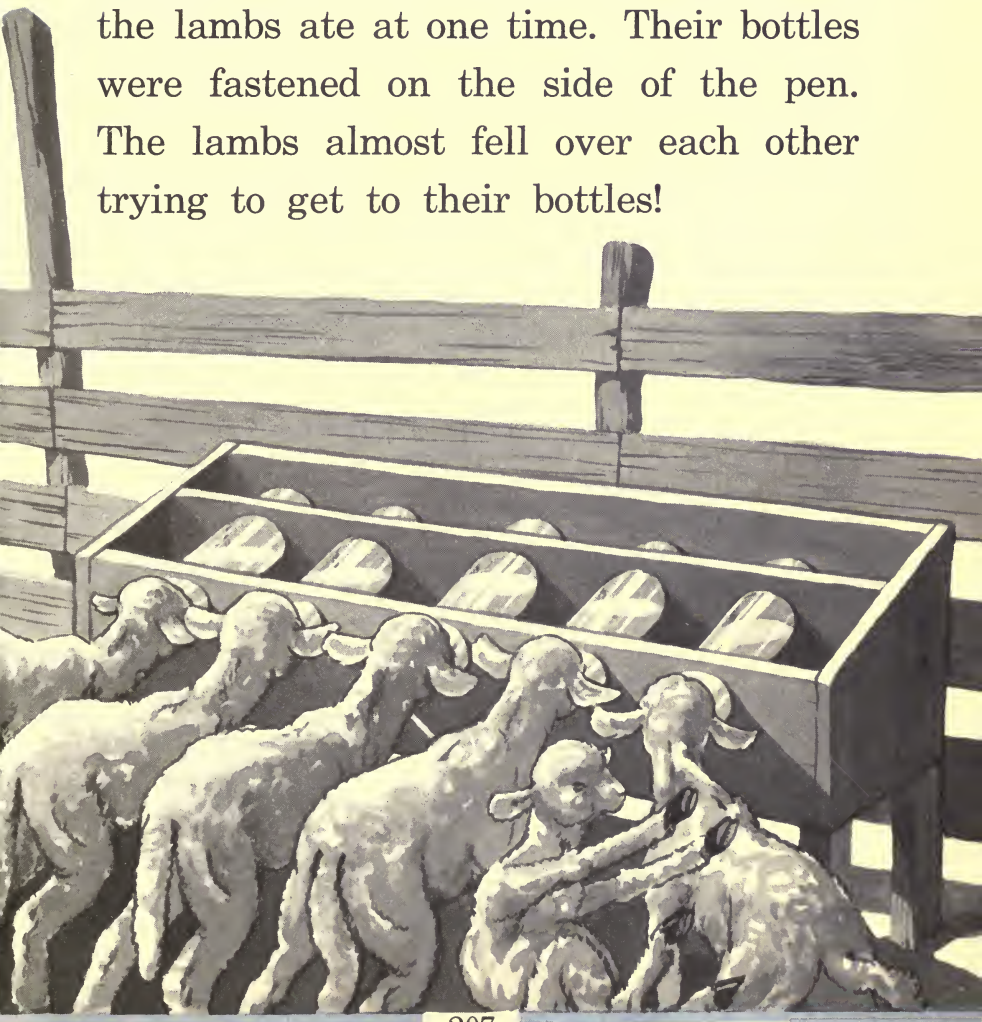
"I know how to feed it," said Jack.

There were many baby lambs on the ranch. Lambs that had no mothers were called bum lambs. Jack had taken care of many bum lambs. He knew how to feed them.

Jack put some milk into a bottle. He put a rubber nipple on the bottle. He put the nipple into the lamb's mouth. The lamb drank all the milk.

Jack put the lamb in a box to keep it warm. He fed it three times a day.

Then Jack put his lamb outside with the other bum lambs. They were in a pen. The pen was made so the wind would not blow on the lambs. All the lambs ate at one time. Their bottles were fastened on the side of the pen. The lambs almost fell over each other trying to get to their bottles!



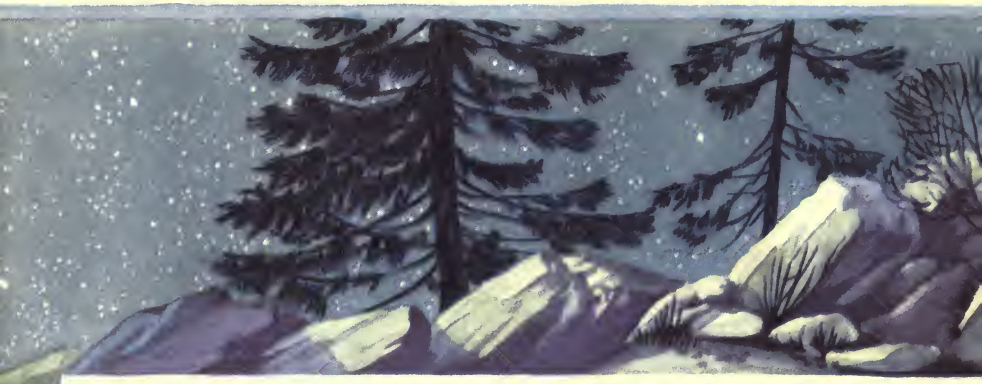
The Spring Sky

"Let's go for a ride," said Jack one night. "Let's look at the stars."

"Where is Orion?" he asked as he and Cowboy Hal rode toward the south.

"We see Orion only in winter," said Cowboy Hal. "But look above. Do you see a band of light across the sky?"

"Yes, I do," said Jack. "What is it?"



"We call it the Milky Way. It is made of many, many stars. The stars are so far away we can see only their light. We can't see each star."

"They make the sky look white like milk," said Jack. "Is that why we call it the Milky Way?"

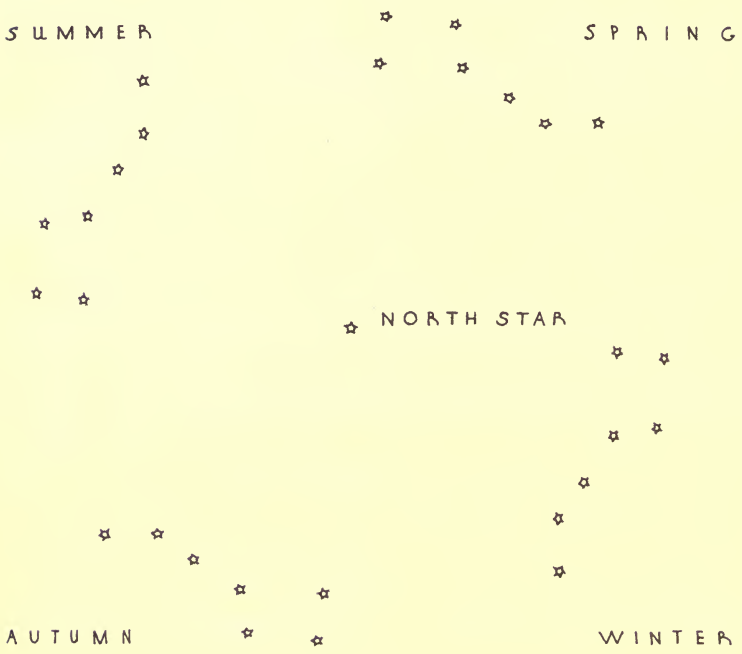
"I guess it is," laughed Cowboy Hal.

"Can you find the Big Dipper?" asked Cowboy Hal.

Jack looked in the north sky. "There it is," he said. "It is upside down."

"The Big Dipper does not always look the same," said Cowboy Hal. "Come inside. I'll make some pictures of it."

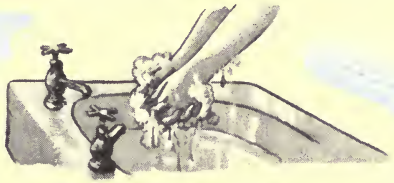
These are the pictures of the Big Dipper that Cowboy Hal made.



"The Dipper seems to turn around in the sky," said Cowboy Hal. "It seems to turn around the North Star."

How to Eat

If you would be clean and neat,
Wash your hands before you eat.



A glass of milk with every meal
Makes you strong. How good you feel!

Vegetables are good for you,
Corn and carrots, spinach, too.

Drinking water every day
Keeps you well, to work and play.

In the Park

The children were playing in the park. It was a beautiful spring day. In spring the sun goes down late. The children could play a long time before dark.

Bob had his new sail boat. Her name was *Daisy Mary.*

"Can she really sail?" asked Nancy.

"I guess she can! I'll show you," said Bob.

Bob put the *Daisy Mary* on the pond. She floated. Along came a wind. It blew the *Daisy Mary* away from shore. She sailed fast. She sailed away into the middle of the pond.

"The wind makes her sail," Bob said.

"Boats must have something to make them go," said Jimmy. "The wind makes sail boats go. The sail catches the wind. The wind pushes the boat. The boat moves through the water."

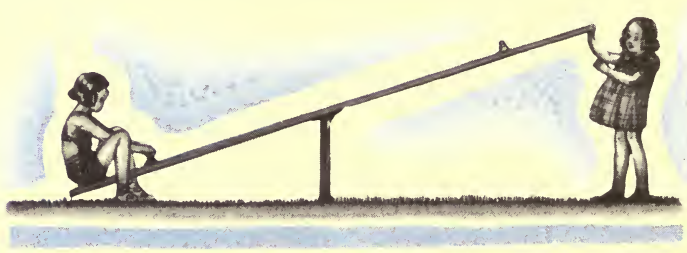
"The wind pushed our windmills and made them go around," said Nancy.

"The wind moves our weather vane," said Jane.

"The sails on a boat must be big," said Miss Adams. "They must catch the wind. Some very large boats have sails. They can sail a long, long way."

The children had fun with the boat.

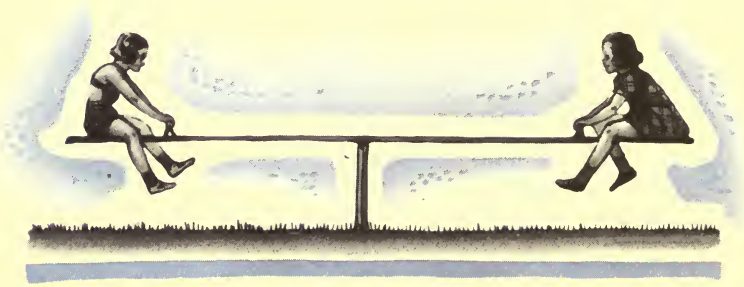
The children had fun on the seesaw, too. Susan got on first. She got on one end. The other end went up!



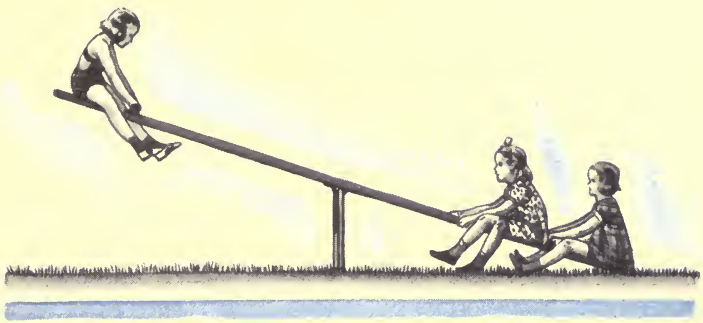
Jane tried to get on the other end of the seesaw. But it was too high. So Susan got off.

Then Susan got on one end. Jane got on the other end at the same time.

"We hold each other up," said Jane.

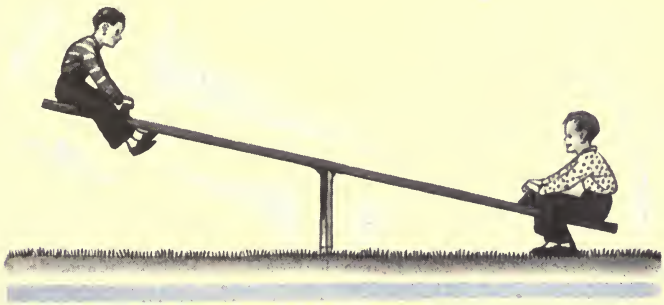


Nancy wanted to ride, too. She got on the end with Jane. This is what happened.



Nancy had to get off before Susan could come down. Then Jane and Susan had fun. They went up and down.

Bob and Jimmy wanted to try the seesaw too. They could make it go fast.



Nancy Takes a Bath

Nancy was playing out of doors. She was having fun. But she was dirty, very dirty. "I like to be dirty," she said. "I'm going to play all day. Maybe I'll never take a bath."

Mother did not say, "Nancy, you *must* take a bath!" She let Nancy keep on playing. She did not call her.

Nancy played in the sand and dirt and mud. Her hands and hair were as dirty as could be. And all the time Nancy did not think about the party.

Jane came. "Nancy," she called. "Are you going to the party?"

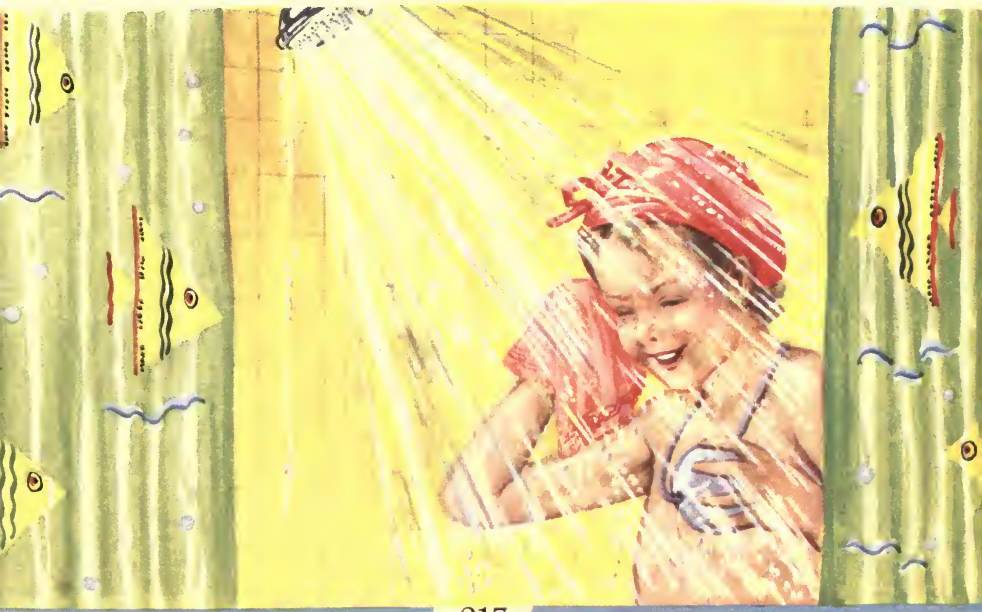
Nancy jumped. "The party! Oh!" she cried. "I forgot the party. I'm all dirty. I can't go to the party."

Jane went on and left her. Nancy ran crying to her mother.

"Oh, mother!" she cried. "The party! I forgot it. I'm dirty!"

"Let's hurry," said Mother. "Take a good bath. Soap and water will soon make you clean. I'll wash your hair and clean your finger nails. You will be at the party before you know it."

How fast Nancy did work! How much soap and water she used! How good it was to be clean again! What fun she had at the party!



A Dry Country

Rita and Pablo live in a dry country. There is not much water. Rain does not fall often. Sometimes Rita and Pablo have to carry water a long way. Then they use it carefully.

Sometimes they have only a little water to wash their hands and faces. They must not use very much. They cannot take baths very often.

Sometimes they have only a little water to drink. They cannot use much water to wash their vegetables.

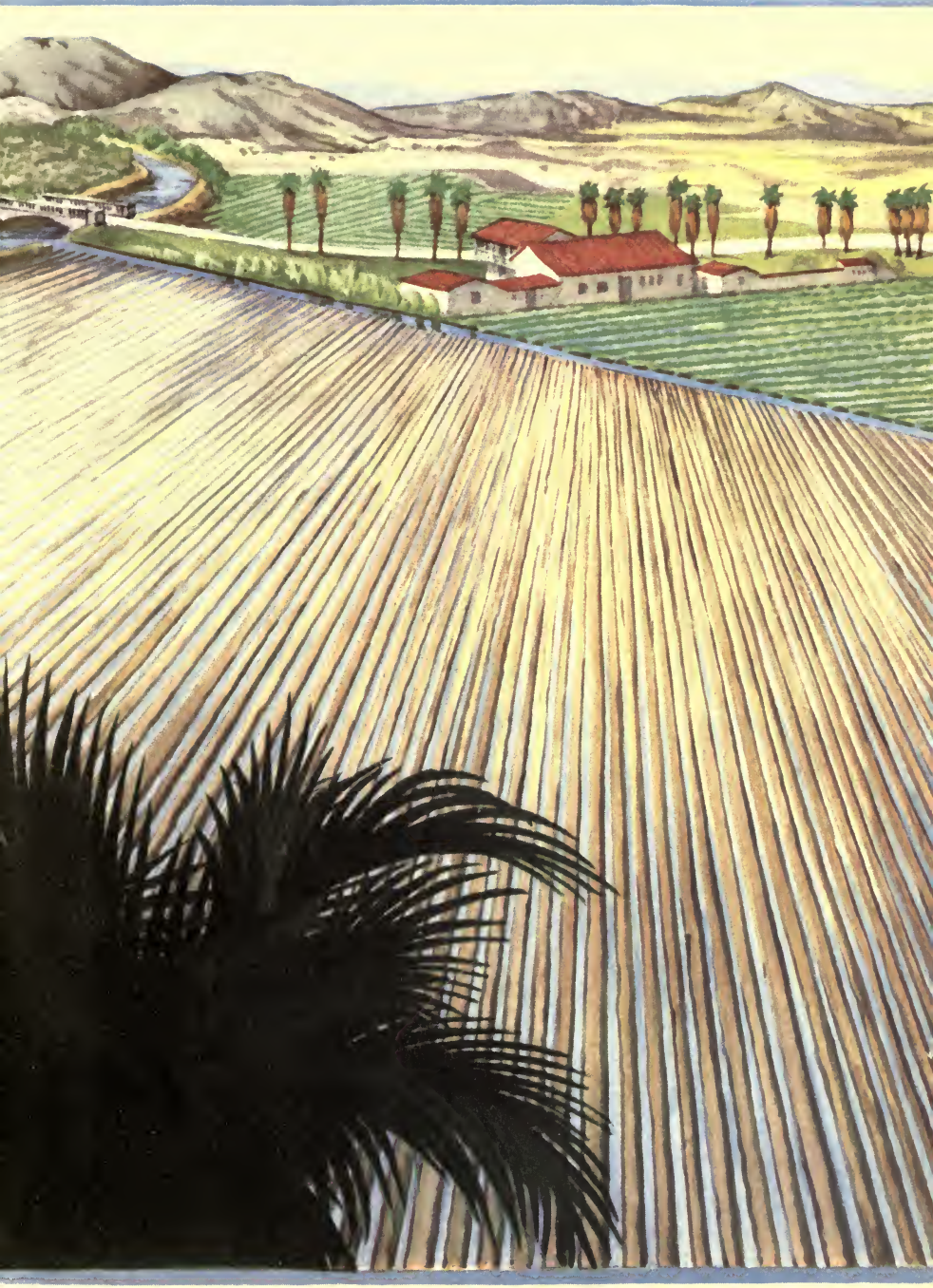
Aren't you glad that
You have water to wash your hands?
You have water to wash your teeth?
You have water for a bath?
You have water to wash your clothes?
You have good water to drink?

Water for the Dry Country

Rita and Pablo's father planted seeds in the field. He planted them early in the spring. He watched for them to grow. For many days there was no rain. The seeds had no water to make them grow. But Rita and Pablo's father did not expect any rain. He knew of a way to water the fields without rain.

Farmers in dry countries know how to water their fields. They save river water in big lakes. In the summer when the weather is dry, they let the water run into ditches. The water runs through the ditches to the fields.

Pablo helped his father water the fields. The water ran out of big ditches into small ditches. It ran out of small ditches into the fields. It made the fields wet all over.



Pablo and his father were careful with the water. They made it run only to places where seeds were planted.

One day. Two days. Three days. Six days. The children looked at the fields.

"The plants are growing! The water made them grow," they shouted.

In the country where it does not rain, most farmers water their fields. They do it as Pablo's father did. Plants grow very well, too, when they have water in this way. Farmers have made many kinds of plants grow in the dry country.

In the place where Jimmy and Susan live there is much rain. At times there is too much rain. Then plants do not grow because the seeds do not grow. The seeds have too much water. They can not get air to help them grow.

A Dust Storm

Rita and Pablo were coming home from school. They were having a hard time. They were in a dust storm.

"O-oh!" said Rita. "The dust gets in my eyes. It makes them hurt. I can't see where to walk!"

Pablo took her hand.

It took the children a long time to get home. The wind was so strong it almost blew them back to school. The dust was so thick they could not always tell which way to go.

Bad dust storms like this one often come in dry countries. When the wind is strong, it blows the dust. It makes clouds of dust in the air. Sometimes there is so much dust that it shuts out the sun. It makes the day dark.

The wind does not often bring rain to the dry country. The wind is very dry. It takes water out of the ground. It makes the water evaporate fast.

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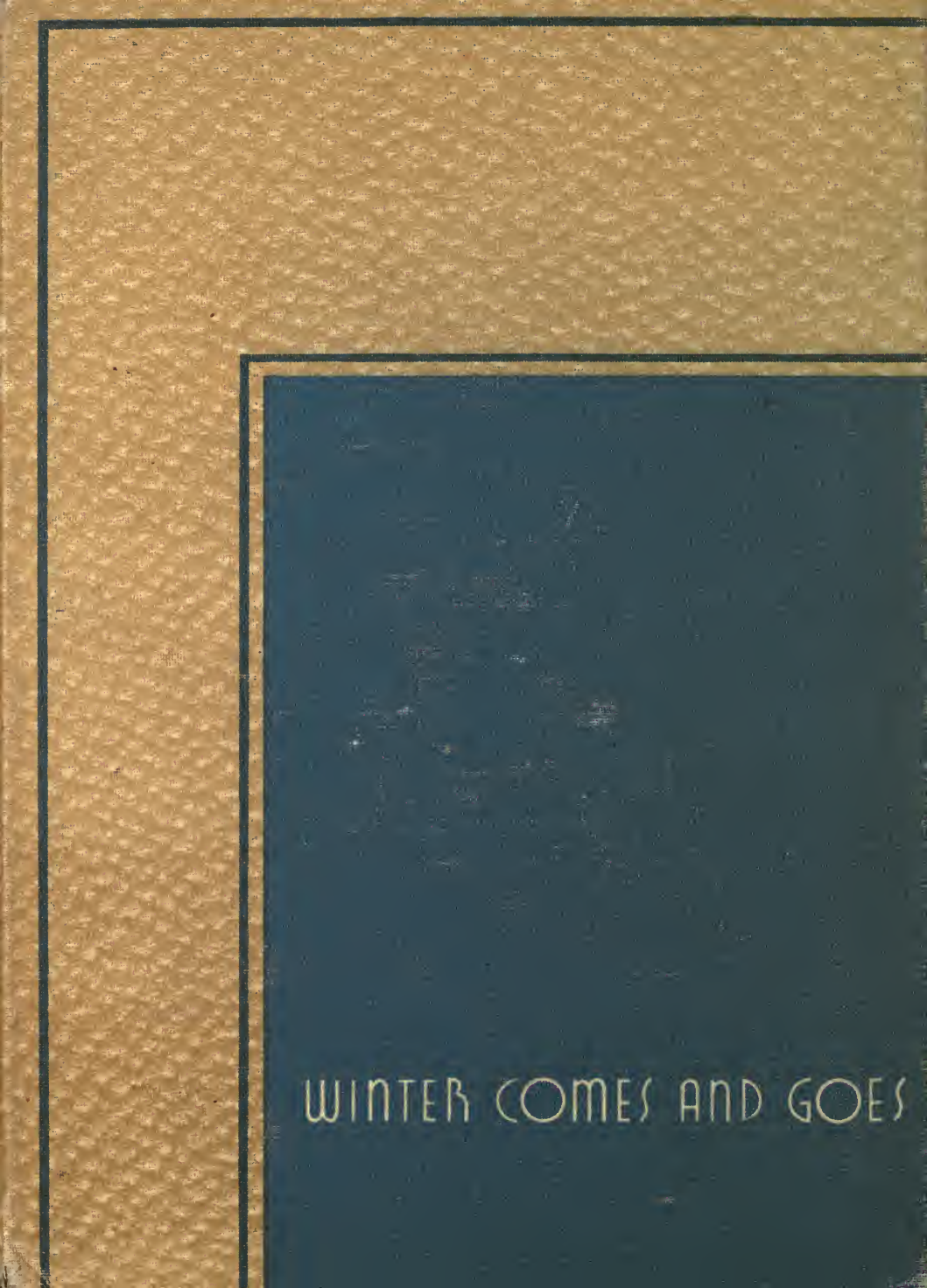
WINTER COMES AND GOES